25th CONGRESS, 2d Session.

[SENATE.]

Supra 36-32
Perrine, Florida.

[300]

SB411
.P47
1838
BOTANIC GARDEN
1°°

IN SENATE OF THE UNITED STATES.

MARCH 12, 1838.

Submitted, and ordered to be printed, and that 5,000 additional copies be furnished for the use of the Senate.

Mr. LINN submitted the following

REPORT:

[To accompany bill S. No. 241.]

The Committee on Agriculture, to whom was referred the memorial of Dr. Henry Perrine, late American consul at Campeachy, praying for a conditional grant of land in southern Florida, to encourage the introduction and promote the cultivation of tropical plants in the United States, have had the same under consideration, and beg leave to submit, to the consideration of the Senate, the following report:

At the express desire of the memorialist, your committee has long delayed its action for the purpose of making a rigid investigation of his suggestions, his services, and his plans in relation to the immediate domestication of tropical plants in southern Florida, and of their gradual acclimation throughout all the southern and southwestern States; and hence your committee has arrived at the conclusion that his services have been great; that his suggestions are important, and that his plans are laudably patriotic and practicable. In obedience to the Treasury circular of the 6th of September, 1827, Dr. Henry Perrine appears to be the only American consul who has perseveringly devoted his head, heart, and hands to the subject of introducing tropical plants in the United States; and his voluminous manuscripts alone exhibit a great amount of labor and research which promise to be highly beneficial to our common country. The memorialist founds his hopes of final success for the immediate propagation of, and subsequent cultivation of, tropical plants in Florida, on four leading facts: 1. Many valuable vegetables of the tropics do actually propagate themselves in the worst soils and situations, in the sun and in the shade of every tropical region, where a single plant arrives by accident or design. 2. For other profitable plants of the tropics which require human skill or care, moisture is the equivalent to manure for tropical cultivation essentially consists in appropriate irrigation. 3. A tropical climate extends into southern Florida so peculiarly favorable to human health and vegetable growth, that the fertility and benignity of its atmosphere will counterbalance the sterility and malignity of its soil. 4. The inundated marshes and miry swamps of the interior of southern Florida are more elevated than the arid sands and untillable rocks of the coast; and hence the same canals which may drain the for-

Blair & Rives, printers.

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mer will irrigate the latter, and afford the appropriate proportion of moisture for both. The memorialist founds his hopes of success for the *gradual acclimation* of many profitable plants of the tropics throughout at least all our southern and southwestern States, on, 1st, the general history of all tropical plants whose cultivation has been gradually extended towards the poles. 2d. The particular history of our actually great staples of the south and southwest, viz: tropical rice, tobacco, cotton, and sugar; and, 3d, the fact that kindred species of many profitable plants which will be still more important objects of *agriculture* are indigenous to our worst soils between the Potomac and the Mississippi, viz: of Agave and Yucca. In relation to the extension of a peculiarly favorable climate of the tropics into southern Florida, your committee believes that the memorialist has demonstrated its existence by the meteorological tables annexed to this report. In relation to the immediate propagation of tropical plants in tropical Florida, on the most arid, the most humid, and hitherto most worthless soils, your committee believes that the memorialist has well shown its great probability by the interesting facts and statements made and collected by him, and which are annexed to this report. And in relation to the gradual acclimation, at least the fibrous-leaved plants, whose foliaceous fibres are superior substitutes for flax and hemp, your committee coincides with the memorialist in his opinion, that the tropical species may gradually extend over the most sterile districts of all our southern States, and that the indigenous species may be gradually propagated in the worst soils of our northern States. Hitherto, southern Florida has been considered so sickly and so sterile as to be unworthy the expense and trouble of surveying and of sale; and, even now, it is seriously contended that this section of the Territory is uninhabitable by the white man, and should, therefore, be abandoned to the savages and runaway negroes from the neighboring States. At all events, it is conceded that many millions of acres are "incapable of producing any article now cultivated in the United States, and must lie unemployed and useless for many years, without some experiment such as Dr. Perrine proposes. Hence, when the Indians shall be expelled from the pestilential swamps and impenetrable morasses of southern Florida, they may again become the impregnable fortresses for fugitive negroes and piratical out-laws, who will be still more dangerous enemies to the tranquillity of our southern States than the actual savage Seminoles. But if the suggestions of the memorialist, and if his experiments should be successful, the arid sands and arid rocks, and mangrove thickets of the coast, the miry marshes, pestilential swamps, and impenetrable morasses of the interior, may all, ultimately, be covered by a dense population of small cultivators and of family manufacturers; and tropical Florida will thus form a well garisoned bulwark against invasion in every shape and shade. Even the statistics of Cuba demonstrate that this celebrated island owes its prosperity and its safety much more to its numerous small cultivators of fruits and vegetables than to its few large planters of sugar and coffee; and hence it may be considered fortunate for all Florida that its southern surface does not embrace any large tracts of rich soil adapted to the great staples of great planters. Hitherto, the old southern States have been drained of their rural population by the emigration of their sons to the fertile plains of the valley of the Mississippi and Ohio. By the introduction of such new staples as can be propagated on the worst soils of the old States more profitably than their old staples can be cultivated on the best soils of the new States, emigration

from the south will be prevented, and even its ruined fields and barren wastes will become covered with a dense population of small cultivators; and that rural population may be tripled by the employment of new staples in the really domestic manufactures of their farms, families, and females. At all events, the numerous small cultivators of the south would thus be enabled to furnish the cheapest possible raw materials for the numerous small manufacturers of the north, and would hence create, mutually, a profitable and harmonious dependence on each other of the great pacific masses of population in both sections of the Union. With these views of the national importance of the enterprise of Doctor Perrine, your committee have determined to report a bill, on such conditions as will render it barely possible for him to attract associates and capital to the aid of his future labors, with unity in design, harmony in co-operation, and perseverance in pursuit. Under the conditions imposed, he only hopes to get co-operators among those patriotic persons, who will be influenced by the facts, arguments, and feelings which convinced his own mind of the great probability of ultimate success, and which, therefore, renders him willing to undergo all the intermediate privations and perils of property and person incident to the prosecution of the enterprise.

In other countries, an undertaking of such magnitude is the especial duty of the Government; but, in the United States, we are indebted to individual zeal and perseverance for the origin and prosecution of the grandest plans of national utility.

On the 26th of April, 1832, the Committee on Agriculture of the House of Representatives reported a similar bill; and your committee now refer to the accompanying report and other documents. Your committee need not dwell on the services of the memorialist, nor recite the precedents of equivalent grants to foreigners, as the memorialist is content to rest his claim solely on the merit of the enterprise, with the facts that by the terms of the bill now reported, if he succeed, the Government and the country will be benefitted in the proportion of a thousand to one, and if he fails, himself and his associates will be alone ruined. From the specimens of fibrous-leaved plants and of foliaceous fibrous submitted to your committee, they are convinced that if those plants alone can be propagated in southern Florida, of which they have no reasonable doubt, they will form highly important additions to the agriculture, manufactures, and commerce of the Union. The committee annex to this report several explanatory letters and other important documents, from 1 to 4.

DOCUMENT No. 1.

Communications to the Committees on Agriculture of the Senate and House of Representatives, January and February, 1838.

WASHINGTON, D. C., *January* 4, 1838.

GENTLEMEN: During the last short session of Congress, the subscriber wrote a brief memorial, dated Washington, D. C., September 8, 1837, which was presented by the Hon. L. F. Linn, on the 29th of the same month, and was "laid on the table, and ordered to be printed." This printed document headed "25th Congress, 1st session. Senate 26. Petition of Henry Per-

rine for a grant of land for the encouragement of the growth of tropical plants," was *taken from the files* and *referred*, on the 21st of December last, on motion of the same honorable member of your committee, and to this short petition the subscriber refers for the motives of the present communication. The printed pamphlets of the 1st session of the 22d Congress, mentioned in the first clause of the short memorial aforesaid, with the report and bill of the Committee on Agriculture of the House of Representatives, will show that, even at that early period, the suggestions and services of the subscriber, under the Treasury circular of the 6th September, 1827, were considered by that honorable committee to be worthy of the nominal favor conceded by that bill, of a grant of land on very onerous conditions to himself and associates, yet exceedingly advantageous to the people and Government of the United States.

The manuscript supplementary memorial of the 29th December, 1834, mentioned in the second clause of the short petition aforesaid, with the appended draft of a bill, will exhibit the additional claims of the subscriber on the justice of Congress up to that period, and his humble willingness to accept any modifications of the law which the wisdom of Congress might devise, under the impression that the law itself would be infinitely more valuable than the land it might convey, in order to attract associates and capital to the enterprise of propagating tropical plants in tropical Florida.

The additional documents and details which the subscriber can exhibit to the committee, will prove, he trusts, that his suggestions and services, continued to the present date, constitute multiplied claims to the favorable consideration of Congress and of his country; and hence the only favor that he solicits is an attentive hearing, a rigid investigation of the merits of his claims, and of the importance of his enterprise.

To facilitate a clear conception of his views, he respectfully represents the four leading facts on which he founds his hopes of success for the *immediate domestication* of many valuable vegetables of the tropics, and for the *speedy cultivation* of other profitable plants of the tropics in southern Florida:

1. Many very valuable vegetables of the tropics do spontaneously propagate themselves in the worst soils and situations, in the sun and in the shade of every tropical region which they reach by accident or by design; and that hence, in general terms, it may be said that the benignity of a tropical climate, or the fertility of a tropical atmosphere, does counterbalance the defects or sterilities of the soil.

2. That, for such other profitable plants of the tropics as require human care or culture to aid their reproduction, moisture is the equivalent to manure, or, in other words, that tropical cultivation consists essentially in appropriate irrigation.

3. That an improved tropical climate extends into southern Florida, peculiarly favorable to human health, and still more favorable to vegetable growth, and that hence the salubrity and fertility of the air in that tropical district, will counterbalance the sickness and sterility of the earth, and the immediate propagation of profitable plants may hence be profitably begun on even the unimproved, uncleared surfaces of tropical Florida.

4. That the peculiar formation of southern Florida is so favorable for irrigation, that the same canals which may drain the inundated swamps of the interior, will irrigate the arid sands and untillable rocks of the coasts,

and afford the appropriate proportion of moisture for the speedy cultivation of valuable vegetables adapted to the soils of both.

His hopes of success for the *gradual acclimation* of many profitable plants of the tropics, throughout at least all our southern and southwestern States, are founded on the general history of all tropical plants whose cultivation has been gradually extended towards the poles; on the particular history of our actually great staples of the south and southwest, viz: tropical rice, tobacco, cotton and sugar, and on the fact that kindred species of many plants, which will be still more important objects of agriculture, do actually exist indigenous to all our country between the Potomac and the Mississippi.

That limiting our considerations for the moment to solely the propagation of fibrous-leaved plants, and the production of foliaceous fibres in Florida and in all our southern States, on the poorest soils, and by our poorest citizens, he repeats his convictions of its unspeakable importance in creating a dense population of small cultivators in the most sterile districts, by the production of a staple in which four-fifths of the labor may be more profitably effected by horse power than by human power. A reference to the statistics of Cuba, will demonstrate that this celebrated island owes its prosperity and its *safety* much more to its small cultivators of fruits and vegetables, than to its large planters of sugar and of coffee; and as southern Florida has not any fertile soils adapted to the cultivation of our actual staples by our great planters, if its most sterile soils can be made to sustain a much denser population of small farmers than any other equal extent of surface in the United States, its proximity to the West India islands renders it especially important that it should thus be constituted a well-garrisoned bulwark against invasion in every shape or *shade*. He further repeats his conviction, that the propagation of fibrous-leaved plants, on the most sterile districts of all our southern States, will be still more important than the cultivation of all their present staples combined, on their most fertile soils; not merely for the amount and profit of the new staple itself, and on account of the quantity and quality of the surfaces it will occupy, but also on account of the character of the labor, and the kind of population it will employ. Emigration of their small cultivators to the new States, will thus be checked; emigration of small farmers to the old southern States, will thus be promoted; and the resulting augmentation of the sturdy yeomanry of the south, will ensure its prosperity, power, and tranquillity.

Entertaining such convictions, the subscriber is anxious that the members of the Committee on Agriculture shall take the necessary pains to satisfy themselves that his convictions are founded on rational data. He is willing to undergo the most rigid cross-examination, and the most severe criticism, that incredulity or enmity may suggest. He is willing to be suspected even of monomania on this subject, provided it will result in a candid trial to ascertain the fact or falsity of the suspicion. He is willing to be stricken, provided he be attentively heard.

I have the honor to be,
Very respectfully,
Your obedient servant,
HENRY PERRINE.

To the Hon. the COMMITTEE ON AGRICULTURE
in the Senate of the United States of America.

WASHINGTON, DISTRICT COLUMBIA,
January 9, 1838.

GENTLEMEN: By the first communication of the subscriber, of the 4th instant, the attention of your body was respectfully directed to the bill (No. 555) of the House of Representatives, of the 1st session of the 22d Congress, reported the 26th of April, 1832, which conditionally conveyed to your memorialist and his associates a township of land, in southern Florida, "to encourage the introduction and promote the cultivation of tropical plants in the United States;" and also to the modification of said bill, rudely sketched at the end of his supplementary memorial, from Campeachy, dated the 29th of December, 1834. In the same communication, he briefly adverted to the four leading annunciations of facts on which he founds his hopes of ultimate success, for the immediate *propagation*, and for the speedy *cultivation*, of all valuable vegetables of the tropics, within the limits of southern Florida; and to the three principal circumstances on which he builds his expectations of the *gradual acclimation* of many profitable plants of the tropics throughout the most sterile districts of all our southern and southwestern States. He now, as respectfully and briefly as possible, will attempt to sketch, under three heads, the principal reasons on which he founds his claims to a favorable report from your committee, of a bill to concede, conditionally, to himself and associates, a township of land, or thirty-six sections, in southern Florida; and to a speedy passage of the same bill into a law, by both Houses of Congress:

1st. The personal services and sacrifices of the subscriber, under the Treasury circular of the 6th of September, 1827, which could not be fully compensated by the Government price of a township of our most fertile soils.

2d. The repeated precedents of equivalent acts of Congress to encourage objects of partial utility to the public, by ceding to foreigners and their associates certain tracts of the most fertile soils in the most valuable situations of the populated portions of sovereign States.

3d. The isolated merits of the enterprise itself, independently of the past services of the subscriber, or without reference to the past acts of Government, and considered solely as a pecuniary contract of Government, by the conditions of which the ratio of advantages to the grantors of the lands must be, in the proportion of a thousand to one, on the part of the grantees.

To demonstrate the claims of the subscriber, under the first head, he can exhibit quires of manuscript and of printed documents, which he fears that the committee will not have time or patience to peruse. That, in obedience to the orders of his own Government, he has suffered more corporeal diseases than the patient Job; and that he has undergone more pains, privations, persecutions, and perils, than the boasting Paul, are circumstances which he fears may not be considered relevant, by corporate insensibility. The examples of many claimants, on the justice of our republican Government, and especially the history of the warriors of our holy revolution, have painfully taught him to fear that, if he appealed to the justice of Government alone, he might grow old and die before a law for his relief could be obtained. Had he been a French or an English consul, and had he rendered the same services to the French or English Government, he has

no doubt that, long ere this period, he would have been both promoted and otherwise rewarded. Preferring, however, the federal republican Government of the United States, whatever may be the evils inseparable from our institutions, to any and all other forms of government in the world, he adverts to his own unrequited sufferings, not as a matter of complaint, but as a subject of regret. He, nevertheless, cannot close this topic without respectfully inviting the attention of the committee to the striking contrast exhibited in the treatment of Professor Doctor Ramon de la Sagra, of the Botanical Garden and Pattern Plantation, near Havana, by the royal Government of Spain. He would further respectfully direct the attention of the committee to some official letters of the Hon. Louis McLane, while Secretary of State, in 1834; and to the resolutions of the Legislature of Louisiana, on the 11th of March last, in reference to the extraordinary services of the subscriber.

Under the second head, the subscriber refers the committee to the act of Congress "to promote the introduction and encourage the culture of the vine," a single extra-tropical plant, which did convey to J. J. Dufour and his associates, foreigners, a certain tract of very rich soil, in a very valauble situation, by which soil and site said foreign grantees were greatly benefitted, although their experiment did fail; and to the fact that the subscriber has solely solicited an *equivalent* act, "to encourage the introduction and cultivation of all valuable tropical plants," which may convey to himself and associate Americans, an equivalent quantity of absolutely sterile soils, in an absolutely worthless situation, by which the native grantees will be entirely ruined if their experiments should fail.

He further refers the committee to other acts of Congress, among the volumes of printed laws with which they are infinitely more familiar than the subscriber has ever had an opportunity to be.

Under the third head the subscriber respectfully refers, firstly, to the report of the Committee of Agriculture of the House of Representative, No. 454, in the first session of the 22d Congress, accompanying the bill in his behalf, which exhibits the sense of that committee relative to the worthlessness of the lands in the peninsula of Florida, to the general opinion of both the Government and of the people of the United States, that southern Florida is so sickly and so sterile a Territory, in consequence f the miry marshes and inundated swamps of the interior, and of the arid sands, untillable rocks, and mangrove thickets of the coasts, as to be unworthy of even the trouble and expense of surveying and sale; to the letter of General Scott to the Secretary of War, in which the General declared that even the *gift of Florida land would be a fraud* on the soldiers; to the report on file in the departments relative to the obstacles presented by the surface of the country to the progress of our arms during the whole Seminole war; to even the printed books on Florida, intended to present the most favorable aspect of that Territory, and to conceal its most unfavorable features; and to the special testimony of the few individuals who are personally acquainted with the character of the coasts and of the interior of the southern extremity of that peninsula.

He thinks it will thus be shown that, for actual staples or common agriculture, all the surface of southern Florida is worse than useless; that the highest estimate of the unsurveyed public lands could not exceed one cent an acre; that the best soils and sites were long since selected under the Spanish Government; that, nevertheless, for the most valuahle soils and sites under

private claims, the asking price does not, in any case, exceed ten cents an acre; that hence, if the public lands in south Florida were even surveyed and in market, they would not be sold at a price equal to that of those contained in the choice grants of private persons; that even these selected soils and sites cannot be either sold or given away on the condition of actual occupancy and cultivation of our present staples; that the settlement of agriculturists at Sinabal island was hence broken up, and that the same failure of all attempts at common agriculture or horticulture will occur to all future emigrants; and that, therefore, all southern Florida must remain a solitary desert, unless the enterprise of the subscriber shall furnish both a mode of successful vegeculture, and a nursery of profitable plants, adapted to its peculiar climate and soil.

The subscriber respectfully adverts to other obstacles in the way of an immediate commencement of tropical vegeculture in tropical Florida; the continued warfare with the savage Seminoles, and the prospective danger from the murderous fugitives, who will remain lurking in the thickets and morasses of southern Florida; the unsurveyed condition of the tropical district, and the probability that it will not be offered for sale in many years; the immense tracts under Spanish grants, with their conflicting claims; and the consequent uncertainty of right or safety in location on supposed public lands; the reputed sickness and sterility of tropical Florida, augmented to an exaggerated degree by the reports of our military officers, and by the speeches of our members of Congress in relation to the impenetrable morasses and pestilential swamps of the peninsula; the certainly miry marshes and inundated swamps of the interior, and the positively arid sands, untillable rocks, and mangrove thickets of the coasts; the undoubtedly great plagues of mosquetoes and sand flies, ticks and scorpions, ants and landcrabs, serpents and alligators, and other noxious insects and reptiles; the much greater labor of clearing and improving the earth in tropical climates, where the great vigor of ceaseless vegetation must be continually subdued by the axe and the hoe; the general ignorance respecting the plants and the culture appropriate to such climates and soils; the past policy of our Government in respect to pre-emption rights, and its prospective policy to bestow on actual settlers select portions of our most fertile soils and valuable situations; the much greater inducements to emigrants offered by Texas and Cuba in the quantity, quality, and the bounty of their soils; the virtually insulated position of tropical Florida, the absence of roads and post offices, and the great distance, difficulty, and expense of communication and intercourse with the populated portions of our own country in general, and of even northern Florida itself; the want of legal ports of entry for intercourse with foreign countries, and especially for the importation of tropical plants; the expense, difficulty, and delay of introducing and propagating living perennial plants; the difficulty of convincing the public that the benignity of the climate will counterbalance the defects of the soil; the equal difficulties and delays in the task of inducing our agriculturists to engage in the culture of strange and perennial plants; and the free admission of all tropical products in the United States, and, consequently, the entire absence of even the incidental protection derived from mere revenue duties to Government.

The subscriber has not yet enumerated all the obstacles, but, writing with a manifold writer and a in a hurry, he offers this apology for the defects of the present undigested communication; and concludes by respect-

fully soliciting that the members of the committee will each suggest objections, note apparent inconsistencies, and demand every explanation in his power to afford.

Very respectfully,
Your obedient servant,
HENRY PERRINE.

To the Hon. the COMMITTEE ON AGRICULTURE
in the Senate of the United States of America.

To the honorable the Committees on Agriculture of the Senate and House of Representatives of the United States of America:

WASHINGTON, D. C.,
January 31, 1838, 8 *o'clock* A. M.

GENTLEMEN: Understanding that a second joint meeting of your committees will be held at 10 o'clock this morning, the subscriber begs leave to present the following short address: The subscriber has repeatedly requested the members of the committees that they should delay their report on the merit of his claims and the importance of his enterprise, until both topics should receive the most rigid investigation which incredulity, suspicion, or animosity, could suggest. Until recently, the subscriber supposed it was universally known that all southern Florida was not worth a cent an acre for the cultivation of our actual staples, and that all the *choice sites* were private property, under Spanish grants. As, however, he yesterday understood, that some member of your committee still believed that the objects of the subscriber might be intended to promote speculation, and as *he* believes that the mixture of mere pecuniary avarice with the motives of himself and associates would be fatal to the ultimate views of his patriotic ambition, he is anxious to dissipate even the shadow of a doubt or a suspicion which may rest in the mind of any member of either committee. He therefore again most respectfully urges his request, that every member of both committees will frankly express the most hidden doubts that exist in his own mind, and the strongest objections which his misconceptions can offer to the minds of others, as the subscriber is desirous of an unanimous report, founded on an unanimous conviction of the merits or demerits of himself and of his enterprise.

He, however, still begs the just privilege of discussing all objections in the presence of the whole committee, and of submitting all official documents and authentic details which may be relevant or necessary.

The subscriber boldly repeats, that he comes before Congress rather to offer, than to receive, favors, from his Government or his countrymen. He does not wish any law by the terms of which the United States will not be benefitted, in the proportion of a thousand to one, on the part of himself and associates.

He adverts not to his services under under the Treasury circular of the 6th September, 1827, although he is ready to prove that for them he is entitled to at least $30,000, or more than the Government price, for a township of our most fertile soils; neither will he now advert to precedents of equivalent grants to foreigners and their associates, of fertile soils and

valuable sites, in the settled districts of sovereign States. He is willing to stand alone upon the isolated merits of his claims, and on the national importance of his enterprise.

Very respectfully,
Your obedient servant,
H. PERRINE.

To the honorable the members of the Committee on Agriculture of the House of Representatives.

WASHINGTON, D. C.,
February 3, 1838, 9 *o'clock* A. M.

GENTLEMEN: Understanding that the fifth meeting of your committee, held on the 31st ultimo, was composed of eight persons, or of all its members excepting Mr. Stone, and understanding, further, that an unanimous vote was given in favor of the merits of my claims, and of the importance of my enterprise, I beg leave to offer a few lines more to your consideration, previous to the adoption of your report and the accompanying bill. Under the dates of the 4th and 9th of January last, the subscriber wrote two addresses to the honorable the Committee on Agriculture of the Senate, and delivered them to the Hon. L. F. Linn; but they were burned by the same fire which nearly deprived of life Dr. Linn himself; and hence your attention is respectfully requested to the original drafts of said letters in his manifold writing book. Presupposing that said letters will be attentively read by your committee, the subscriber appends a few more facts, observations, and remarks.

In his written address to your committee, left on the table of your room, on the 31st ultimo, he adverted to the fact, that, for the cultivation of our actual staples, the whole public lands in south Florida are not worth the average price of one cent an acre. If any doubt of that fact still exists in the minds of any member of your committee, the subscriber begs the privilege of dissipating that doubt by the testimony of personal witnesses and authentic documents. The same favor he requests in relation to the facts of the best sites and soils being selected under Spanish grants, and being now private property. The twelve miles square at Cape Florida, embraces the only site valuable either for a harbor or for water power on the main land of south Florida. The original Spanish grantee, Arambide, had every opportunity for selection, many years ago, for the purposes of erecting saw-mills and exporting lumber, on which conditions it was expressly granted by the Spanish Government; yet it appears that his enterprise was a ruinous failure, and I doubt not that it will prove equally ruinous to all future speculators in the same line, both on account of the defective quality and quantity of timber, and on account of the equally deceptive nature of the reputed water power.

In reference to the great expense of clearing and enclosing even untillable rocks in a tropical climate, the subscriber refers your committee to a letter from the collector at Key West, in which he calculates the cost of clearing and enclosing a single acre, at $200, on that island. Hence, also, the failure of all persons who have hitherto emigrated to south Florida, and attempted to commence the culture of our common staples in our

usual way, of previous clearing, and enclosure, and cultivation. The settlement at Sinabal island was hence abandoned by the party that went from New York some years ago, after having wasted many thousand dollars in the fruitless enterprise; and hence I repeat that every future settler in south Florida will be ruined, unless preceded by the associate labor of a company which shall introduce the appropriate plants, and teach the appropriate mode of propagation adapted to the peculiarity of its climate and soil. Hence, also, Texas and Cuba will continue to attract our agricultural emigrants in thousands, and southern Florida will become a solitary desert, or will be occupied by a still worse race than the Seminoles. Its pestilential swamps and impenetrable morasses, will become the fortresses of the worst portions of the black and piratical inhabitants of the adjoining West India islands. But the subscriber has the ambition to demonstrate to his countrymen, that the benignity of the climate of southern Florida will overbalance the malignity of its soil; and that the propagation of various plants may be profitably effected in the most stony, sandy, marshy, and miry surfaces; and that the ultimate results will be the creation of a dense population of small cultivators and family manufacturers. It will be the work of many years, it is true, but he who has devoted ten years of his life to one object of ambition, affords the best guarantee of the perseverance of his exertions during his remaining years.

In acquiring the right and safety of location for six miles square in southern Florida, the subscriber will have merely acquired the foundation stones of his enterprise. In addition to the numerous and formidable obstacles interposed by nature alone to the progress of that enterprise, the policy of our own Government, of the Governments of Texas and Cuba, and of the proprietors of the immense tracts under Spanish grants in south Florida, will operate as so many additional obstacles to my endeavors to get associates in my labors. By the terms of our pre emption laws, every actual settler can obtain a quarter-section of the richest soils in the most valuable sites, and have the virtual property of all the adjoining lands, without any stipulations of introducing and propagating strange, living, and perennial plants. By our compromise tariff, my enterprise is deprived even of that indirect protection incident to revenue duties, as all the products of the tropics are now admitted free of duty into the United States. By the terms of emigration to Texas and Cuba, our agriculturists are seduced in the greater quantity, the better quality, and the entire bounty of their soils. By the terms on which the proprietors of the immense tracts under Spanish grants have acquired their titles in south Florida, the land does not, probably, cost them one-tenth of a cent per acre; and hence it will be their interest to give away large portions to actual settlers on the simple condition of actual occupation. The immense grant to the Duke of Alogon called Hackley's, is said by J. Lee William, in his recent book on Florida, to contain eight millions of acres; and in 1832, during the pending of the bill in behalf of the subscriber and his associates, the said Hackley offered ten thousand acres of that tract to the subscriber, on the sole condition of location upon it, and with the privilege of selecting those ten thousand acres in the whole southern extremity of the eight millions of acres. By the advice of the honorable J. M. White, the then delegate from Florida, the subscriber was induced to refuse the *gift* of said ten thousand acres, and to attach more importance to the conditional grant of Congress, contemplated by the bill of the 22d April, 1832, which he was assured would

speedily become a *law*. So much more importance did he still continue to attach to the law than to the land itself, that, by his supplementary memorial of 29th December, 1834, from Campeachy, your committee will have perceived that he was content to have the bill so modified as to concede solely the pre-emption rights to thirty-six occupable sections of land below 28°; and even now he would be willing to have the grant restricted to the pre-emption rights of thirty-six *quarter*-sections below 26° north latitude alone, in preference to the onerous conditions of the bill for six miles square, with but five years of time. If the committee, however, should think that the onerous conditions of the present bill are yet not sufficiently oppressive to guard against all possible speculation, the subscriber respectfully suggests that, by limiting the strip of territory for his location to a line below 26° of north latitude, between Cape Florida and Cape Sable, they will effectually cut off all possible chances for maritime ports or maritime cities. The only white man, in his knowledge, that has made a partial exploration of the southwestern extremity of Florida, was Doctor Leitner, of Charleston, who, on his return to that city, gave a public lecture, and exhibited a transparent map of the country, which the subscriber believes would frighten every person but himself from all desire of spending a single day in the same regions. The subscriber himself would never dream of attempting to inhabit such a section of the country in any quarter of the globe, were it not for the counterbalancing circumstances of its relative position, of the form of our Government, and of the character of our people; for, whatever may be the defects of our citizens, or of our institutions, a painful experience of ten years in Mexico has satisfied him of the infinitely greater evils to which native Americans are exposed in all foreign countries.

I have the honor to be,
Gentlemen, very respectfully,
Your obedient servant,
HENRY PERRINE.

To the honorable the Committee on Agriculture in the Senate of the United States of America:

WASHINGTON, D. C., *February* 24, 1838.

GENTLEMEN: Slowly convalescing from a second attack of sickness, the subscriber again respectfully addresses the committee. Having just received a letter from Indian Key, in tropical Florida, dated the 1st of this month, and written by Charles Howe, Esq., inspector of the port, and postmaster at said islet, the subscriber respectfully submits it to the committee to sustain his position that all southern Florida is entirely worthless for our actual staples or actual methods of cultivation. Mr. Howe has resided many years in tropical Florida, and in moral character is not surpassed by any resident of that country. The failure of himself, of the association at Sinabal island, and of all others who have made the attempt, is sufficient to demonstrate the correctness of the position of the subscriber, that without new staples peculiarly adapted to the peculiar soil, climate, and formation of southern Florida, its lands will never be worth a cent an acre. In the Alexandria Gazette, of this morning, there appears, under the head of news from Florida, a com-

munication, dated at Fort Jupiter, Jupiter inlet, February 4, 1838, of which extracts are respectfully submitted: "We have been delayed at this place, until the present time, by want of shoes for the men, one-third of them being barefooted, and most of them having their clothes torn off. This is not surprising, considering the nature of the country through which we have passed, one-half of which is covered with the saw palmetto, and the other half with water and sawgrass, destroying not only their shoes and clothes, but severely lacerating their flesh. The greater part of the dragoons will be dismounted, in consequence of their horses being worn out. Our time for operations is becoming limited. Beyond March, no human being could live in this country. Even the Indians themselves acknowledge that it is uninhabitable." The sawgrass mentioned above is presumed to be the species of sedgegrass, called Schœnus effusus, with leaves prickly forwards, and six to ten feet high, of which the generic term signifies a *cord*, given as a name to a rush, of which cords were made. The saw palmetto is probably the Chamœrops serrulata, with plaited palmate fronds, and sharply serrate stipes. Several species of this genus of palms afforded to the Florida tribes, food, wine, sugar, fruit, cabbage, fans, darts, ropes, and cloth. Some have good fruit like plums; others, austere like dates. They are now chiefly used to make hats, fans, baskets, and mats, with the leaves.

However troublesome to the march of armies, or even of individual travellers, Divine Providence has thus furnished the means of covering the poorest soils of Florida with a dense population of small cultivators and of family manufacturers. The subscriber also submits to the committee, an index of the officinal and economical plants mentioned in the Natural System of Botany of John Lindley, (2d edition, London, 1836,) with the common and botanical names of some other very valuable vegetables inserted by himself. A reference to Eaton's Manual of Botany will show the names of nearly four hundred species of exotic plants introduced into the United States, of which, however, the greatest proportion are of very little practical utility. Hence, although many valuable plants are not embraced in the aforesaid list, yet a comparison will exhibit the immense number of useful exotics yet remaining to be introduced into our common country. As the English editions of scientific works are extremely costly, the subscriber cuts out from Lindley's Introduction to Botany, (2d edition, London, 1835,) the chapter on the geography of plants, and adds some notes, to illustrate the practicability and importance of the immediate domestication of tropical plants in southern Florida, and of their gradual acclimation throughout our southern States. As the documents which accompany the report of the committee of the lower House, made on the 17th, contain an abridged account of various fibrous-leaved plants, the subscriber now presents merely a leaf, on which is copied the descriptions given, by various botanists, of the characters, habits, and range of our indigenous Yuccas and Agave, by which it is shown that they prefer the worst soils from Pennsylvania to Louisiana, and from the banks of the Potomac to the banks of the Missouri, "from the confluence of the river Platte to the mountains."

He further submits the metereological tables which demonstrate the extension of a peculiarly favorable climate of the tropics into southern Florida; and two official letters to the Secretary of State concerning numerous plants, which may be profitably propagated or cultivated on the worst soils of tropical Florida. Believing that no rational objection can be made to the speedy passage into a law of such a bill as your committee may report, he respectfully trusts that, after six years' delay, it may now be carried through

both Houses in time to enable him to transport a cargo of living tropica plants into southern Florida previous to the summer rains.

The sufferings of ten years have so exhausted his vitality, that he cannot hope to live until the successful termination of his enterprise; and he is, therefore, anxious to make a speedy commencement, under such circumstances that he can insure its zealous and persevering prosecution and completion by others. He will then be content to lay down that life which has long been a painful burthen, under the belief that he cannot leave to his children a better inheritance than the reputation of his being a public benefactor to his country.

I have the honor to be, gentlemen,
Very respectfully,
Your obedient servant,
HENRY PERRINE.

Extracts of letters from an officer in Florida, published in the National Intelligencer of 26th February, 1838.

The letters are dated the 8th and 9th February, at a spot about twenty miles south of Fort Jupiter. He describes a difficult march through briers, thick bearded sawgrass, (which is strong, and from its name, cuts badly,) in black mud up to the waist, and crossed where ten Indians might defy a hundred of the best troops in the world, from the peculiar situation of the country.

"I hope something may be done to put an end to this almost interminable war; interminable, I say, because the Almighty has placed these savages in a country inhabitable only by themselves, and where Xenophon's army could not displace them so long as they choose to remain. They have fastnesses and hiding places, where they lie in ambush; wait until we come up, fire upon the advance, kill and wound, and then run off." The writer says there is but one opinion as to the policy of permitting the Indians to remain. "The clouds are gathering, and indicate rain, which, should it come, will put an end to this campaign; for the ground where I am now sitting would, with six hours rain, be overflowed some inches deep." He further says that "the Seminoles, at the late council, wished permission to retain a small portion of the country; and that Gen. Jesup has consented that they shall remain until they hear from Washington." "In my opinion, they could be made useful allies instead of a daring foe, and would occupy a portion of country uninhabitable by white men, unless, possibly, some more degenerate than the untutored savage." Again, on the 9th February, he again says: "I still express my opinion that the policy of the Government ought to be to permit them to remain."

P. S.—27th February. By a letter of the 7th instant, from Tallahassee, in the Territory of Florida, the subscriber has just learned that the Legislative Council, without a dissenting voice, has passed a new act of incorporation for the Tropical Plant Company, of which James Webb, the judge of the federal district court at Key West, Charles Howe, inspector of the port, and postmaster at Indian Key, and the subscriber, are trustees. He had desired that two of the trustees should be the presidents of the agricultural societies of Louisiana and South Carolina, at New Orleans and Charleston; but it

appears that they were objected to, because non-residents of the Territory. The bill was unanimously reported by the Committee on Agriculture, and as unanimously passed into a law by the Legislative Council. By a reference to the report of the Committee on Agriculture of the House of Representatives, made on the 26th April, 1832, there will be seen, among the accompanying documents, an extract from the message of the Governor of the Territory, at the beginning of the then session of the Legislative Council, in which he said: "Although Mr. Perrine has made no direct application, I earnestly recommend the granting of a charter, as he wishes, and the bestowment upon the company of as many privileges as may be compatible with the public interests. The National Legislature, it is to be hoped, will afford aid to so laudable an enterprise; and one which, if successful, promises to be of national benefit." A consequent act of incorporation was passed, the second on the calendar, the 14th January, 1832; but, by the 12th section it was provided, that "if the company should fail to carry into execution the objects contemplated by this act, by the 1st January, 1834, then this act is to cease, and to be of no effect." In addition to the many insuperable obstacles arising from other causes, the delay of the bill before Congress, in behalf of the subscriber and his associates, has been, in itself, sufficient to prevent the enterprise from being carried into successful execution; and should not the conditional grant of land be made during this sixth subsequent session of Congress, he fears that the new charter of the Legislative Council will also fail to attract associates and capital for the experiment.

HENRY PERRINE.

Nuttal's genera of North American plants, and a catalogue of the species, to the year 1817; *Philadelphia*, 1818.

Genus 318. Yucca, L., (Adam's needle.) *Corolla* inferior, campanulate, segments not nectariferous. *Filaments*, of the stamina subelavate. *Style*, none. *Capsule* oblong, with three obtuse angles, three celled, opening at the summit; seeds flat.

Proper stem, none; caudex inconspicuous or assurgent, and shrubby, leaves comose, (or crowded and terminal,) uniform, spiny at the point, sometimes with a sphacelate filamentiferous margin; flowers in a terminal, irregular panicle, each protected by two spathes; corolla white, roundish campanulate.

Species 1. Y. *filamentosa;* 2. *angustifolia.* Stemless, leaves glaucous, long linea and mucronate, margin filamentose; capsules large and *dry* oblong obovate. *Hab.* On the banks of the Missouri, from the confluence of the river Platte to the mountains; flowers large and white; leaves scarcely half an inch wide: 3. *recurvifolia.* In sandy fields, North Carolina, v. v: 4. *gloriosa.* Capsule internally filled with a sweetish pulp of a purple color. This plant is called *Petre* by the Mexican Spaniards, and used for cordage, ropes, &c., as well as for packing cloth, and is extremely durable: 5. *aloifolia.* There is also a 6th species of this genus, discovered by the late Mr. John Lyons, improperly called Y. angustifolia, by the gardeners around London; it is nearly allied to Y. filamentosa, but much narrower leaved; with its specific character I am unacquainted. An American genus, affecting the sandy sea coasts.

Genus 319. Agave, L. *Corolla* superior, erect, tubulous or funnel form. *Staminiferous* filaments longer than the Corolla, erect. Capsule (inferior) triangular, many seeded.

Caudex sometimes ligneous and ascending; leaves radical, or comose, rigid and channelled, with the point, and often the margin, spiny; younger leaves obvolute, or rolled around each other spirally; panicle ascending from the caudex, very large and pyramidal. A genus scarcely differing generally from aloe, except in the situation of the capsule, which is *inferior*. Species 1. A. Virginica. *From Virginia to Florida; also, in Upper Louisiana.* An American genus, chiefly tropical. A. Americana is the largest of all herbaceous plants: its panicles of flowers are of the magnitude of small trees. In Peru and Mexico, it has long been cultivated by the indigenes and colonists, for various and important economical purposes. It affords an abundant and vinous liquor, and, by distillation, alcohol; of the fibres of its enormous leaves are made thread and paper, &c.*

Michaux's Flora, Boreali Americana, Paris, 1803, *vol.* 1, *p.* 187; *Classis* 6. *Hexandria Monogynia.*

Section 1. Ovario infero. Agave, L. *Cor.* erecta, supera. Filamenta corolla longiora, erecta.

A. Virginica. A. foliis integris, mucronatis; scape simplicissimo, spicifloro; ovario subrotundo triquetro; staminibus exertis. Obs. Flores odoratissimi, obsolete virentis. *Hab.* inherboris Carolinæ et Virginiæ.

Section 2. Ovario supero. Yucca L. Cor. campanulato-patens. Stylus nullus. Caps. 3 locularis. Y. filamentosa. Y. acaulis; foliis latiuscule lanceolatis, margine passim filamentosis. *Hab.* in littoralibus et remotis occidentalibus Carolinæ et Virginiæ. Y. aloifolia. Y. caulescens; foliis lineari-lanceolatis, minutis denticulis callosis quasi serrulatis. *Hab.* in littoralibus Carolinæ, Floridæ, &c. Y. glorioso. Y. caulescens; foliis latiuscule lanceolatus integerrimus. *Hab.* in littoralibus Carolinæ.

Pursh's Flora Americæ, Septentrionalis, London, 1816, *2d edit.*

Genus 294. Agave. Cor. supera 6 fida; limbo erecta. Filam. corolla longiora, erecta.

Genus 298. Yucca. Cor. infera, campanulatus laciniis non nectariferis. Filam. clavata. Style. O. Caps. oblonga, obtuse 3 gona sem. plana.

Agave. Gen. pl. 582. Virginica. 1. A. acaulis, herbacea; foliis cartilagineæ-serratis scapo simplicissimo. (Wild. Sp. pl. 2, p. 193; Icon. Jacq., icrar 2 to 378; Bot. Mag. 1,157.) On the rocky and fertile banks, Virginia to Carolina, 4 July, Aug. v. v. Flowers greenish yellow, very fragrant.

Yucca. Gen. pl. 580. filamentosa 1. Y. acaulis; foliis lato-lanceolatis integerrimes margine filamentosis, stigmatibus, recurvato-patentibus. (Wild. Sp. pl. 2, p. 184; Icur. Tren. ehret to 37.) On the shores of Virginia and Carolina, and in the western parts thereof, 4 July, Aug. v. v. Flowers white, very showy, and the plant is from four to five feet high.

* Note by H. P.—The *Pulque* Agave is not the A. Americana; neither is the *Mezcal* Agave the same plant; nor is the Henequen, or *Sisal Hemp* Agave, the same species. The first yields the substitute for cider, in the juice of the developing *stalk*; the second yields ardent spirits, by distillation of the *roots*; and the third yields the substitute for hemp, by scraping of its living green leaves.

Y. angustifolia. Y. acaulis ; foliis longa linearibus rigidis margine raro fi' ɛ-mentosis, capsulis magnis obovato-cylindraceis. On the banks of the Missouri, 4 July, Aug. v. s. in Herb Nattal. From two to three feet high, leaves very narrow, capsules large.

Y. recurvifolia. 3. Y. caulescens ; foliis lineari lanceolatis viridibus recurvo deflexils margine raro filamentosis petalis interioribus latioribus. (Salisb. in parad. lond. 31.) On the sandy shores of Georgia. Leconte, ♄ July, Aug. v. v. Flowers greenish yellow, with a tinge of purple ; stem about three feet high. This species has been confounded with the following :

Y. glorioso. 4. Y. caulescens, ramosa ; foliis lato-lanceolatis plieatis integerrimis, petalis lanceolatis. (Wild. Sp. pl. 2, . 183 ; Icon. Bot. Rep. 473 ; Bot. Mag. 1,260.) On the sea shore of Carolina, 4 July, Aug. v. v. Flowers white ; plant about ten feet high.

Y. aloifolia. 5. Y. caulescens, ramosa ; foliis lineari-lanceolatis callosocrenulatis strictis. (Wild. Sp. pl. 2, p. 184 ; Ic n. Dil. elth 323, f. 416 ; Comm. præl. t. 14.) On the coast of Carolina and Florida, 4 Aug. v. v. Flowers white.

Eliot's Botany of South Carolina.

Agave Virginica. Stemless, herbaceous, leaves with cartilaginous serratures. Scape simple. Root perennial, tuberous, premorse. Radical leaves long lanceolate, acute, very smooth, succulent. Stem leaves semiamplexicaul, acute, resembling scales. Scape four to six feet high, terete, glabrous. Flowers sessile. Calyx, none. Corolla fragrant, of an obscure yellow color, tubular, furrowed, segments shorter than the tube, acute. Filaments spotted, twice as long as the corolla, inserted into the base. Styleteretes shorter than the filaments, spotted. Capsule globular, slightly three-furrowed, three-celled, three-valved. Seeds numerous, compressed, angular, two-rowed in each cell, attached to a central receptacle. *Grows in pine barrens.* Flowers in July. Common names and synonymes : Virginian Agave. Rattlesnake's master. Thick-leaved snakeroot ; the root is bitter ; in some neighborhoods it is given in tincture as a remedy for flatulent colic, and as such seems deserving of notice.

Remarks by Henry Perrine.

The foreign authors who have noticed this indigenous Agave of the United States, are chiefly the following : Linnæus, Sp. pl., p. 461 ; Willdenow, Sp. pl., II., 133 ; Rœmer and Schultes, Syst. Veg., VI., 725 ; Botanical Magazine, 1,157 ; Lamarck, Encyclop., illus. gen. plate, 235, fig. 2 ; Jacquin. Icon., rar. II., plate 378. The latter gives a detailed description, and then follows the observation of the range of this species. "This species ranges from the *southern parts of Pennsylvania* to Florida."

Our indigenous Yuccas have extended into the northern States, as ornamental plants, and have endured the winters of many years without injury to their leaves. In the garden of David Thomas, Cayuga county, N. Y., the Yucca filamentosa exists through the coldest seasons with the leaves green and undamaged. The Yucca flaccida also grows well there, is perfectly hardy, and increases readily by offsets. At Princeton, N. J., in January, 1838, green leaves of the Yucca filamentosa were dressed in a common flax-

mill, and the resulting foliaceous fibres are now in the room of the Committee on Agriculture of the House of Representatives, 22d Feb., 1838.

H. P.

Travels in the equatorial regions of South America in 1832, *by Adrian R. Terry, M. D.; published in Hartford*, 1834.

Travelling from Guayaquil towards Quito, upon the highlands or mountains, at page 137, he says: "Mocha is the most miserable Indian village (notwithstanding its inn) which I have seen in South America." The climate is rendered excessively disagreeable by the cold snowy winds which blow from the adjacent mountains. At 9 A. M., (of the 12th of July,) with a bright sun and very little wind, the thermometer stood at 48° Fahrenheit. At 1 P. M., started for Hambato, distant about six leagues. The country is little else but a succession of *sandy plains*, separated by ravines, or water courses, made during the rainy season. These were generally dry, or at most, but a scanty stream wound along their bottom. In some of the less barren spots, *fields of wheat* were to be seen. These fields are surrounded by hedge rows of the Agave Americana,* p. 138.

Fibrous-leaved plants and foliaceous fibres.

The plates of fibrous-leaved plants are intended to illustrate the divisions and subdivisions under which the genera and species are placed, according to the arrangement adopted by the subscriber, in his abridged communications to the Committee on Agriculture of the House of Representatives. They also exhibit our indigenous species of Yucca and Agave, or fibrous-leaved plants of the United States, which *prefer the most barren soils*, from the Potomac to the Mississippi, and of which some species have extended into even our northern States. The first two plates were intended to represent specimens of fibrous-leaved plants, of the instruments for dressing the leaves, and of the foliaceous fibres, which have all been examined by the members of both committees on agriculture. As the originals still remain in the room of the Committee on Agriculture, these two plates may induce other members of both Houses of Congress to examine the specimens themselves; and, at all events, these plates will enable our distant agriculturists throughout the Union, to form a more adequate conception of the nature and importance of propagating fibrous-leaved plants, and of preparing their foliaceous fibres. The subscriber has travelled thousands of miles, and spent thousands of dollars, to exhibit his specimens of superior substitutes for flax and hemp; and he has the consoling recollection of the fact, that every intelligent agriculturist and statesman, who has devoted the time and attention necessary to understand the subject, has coincided with his opinions of the immense importance of producing these new staples on

* In the 2d No. of the 25th volume of the American Journal of the Sciences and Arts, January, 1834, is a paper by H. Perrine, Esq., on the Agave Americana, in which he seems fully to have established that the PLANT producing the HENEQUEN, or coarse hemp-like fibres, which are so universally used in the interior of Colombia, as well as in Mexico, and THAT producing the juice from which the fermented liquor, called *pulque*, is made, *are distinct*. I did not turn my attention to the subject when in Colombia, taking it for granted that Humboldt was correct on the subject; but I now recollect seeing but one species of Agave, and never seeing the *pulque*, or hearing it spoken of as an article of manufacture; while the henequen, which is made from the fibres of the leaves, is almost the only cordage to be met with in the interior.

the worst soils of the United States. Every agricultural society; every scientific association; every agricultural or scientifical periodical, that has become acquainted with his services and suggestions in behalf of the immediate domestication of tropical plants in southern Florida, and of their gradual acclimation throughout our southern States, have borne their united testimony to the practicability and importance of his great enterprise. Admitting, for sake of argument, that solely the fibrous-leaved plants will be domesticated in southern Florida, and acclimated in the southern States, he is willing to rest the merits of his humble petition to Congress on the production of foliaceous fibres alone. The individual members of both committees will do him the justice to admit the fact, that he has merely solicited their attention to the isolated merits of the enterprise itself; that he has not used any extraneous influence to operate on the minds of themselves, or of other members of either House; and that his principal ambition has been to obtain their unanimous report, founded on their unanimous convictions of the national importance of his plans, to introduce and propagate the most profitable plants on the poorest soils.

On the style and character of their reports, will greatly depend his hopes of speedy success to attract patriotic and philanthropic associates, who will persevere in the prosecution of the undertaking, to which he has already devoted the best years of his life. Under the simplifying division of the fibrous leaved indigenous plants into two groups, the one is characterized by *liliaceous flowers;* and the other by *spadiceous flowers.* Under the first group, he has made three tribes, viz: the *lily tribe,* the *amaryllis tribe,* and the *pineapple tribe.* Under the second group, he has placed three tribes, viz: the *screw-pine tribe,* the *banana tribe,* and the *palm tribe.* Under the *lily tribe,* he has placed the genera of *Yucca* and of *Phormium,* and *Aloes* may be conjoined. Under the pineapple tribe, the genus of *Bromelia,* of *Agave,* and of *Fourcroya.* Under the amaryllis tribe, Lindley has placed the Agave and Fourcroya; but they are still retained in the pineapple tribe by other botanists. Under the screw-pine tribe there is but one genus, the *Pandanus,* of which there are *many species.* Under the banana tribe, are placed species of the genera *Musa* and *Heliconia;* and under the palm tribe species of the genera called Bactris, Mauritia, &c. And hence, by a reference to the plates containing species of either of the genera named, a general idea may be obtained of the common resemblances, and peculiar differences, in the leaves of each and of all.

H. PERRINE.

WASHINGTON, D. C., *February* 24, 1838.

INDIAN KEY, TROPICAL FLORIDA,
February 1, 1838.

DEAR SIR: Referring you to my letter of yesterday, I hasten to make some further remarks by this mail.

1st. Whoever emigrates to tropical Florida with an idea that they can derive a subsistence from our actual staples of agriculture or horticulture, on the plan and at the seasons to which they have been accustomed, will be most sadly disappointed. I have experienced enough, since my residence in Florida, to convince me of this fact; and have seen others around me suffer materially from the same erroneous idea. Look at the attempt to

make a settlement at Sinabel Island: several *wealthy*, *intelligent*, and *enterprising* men, from New York city and State, emigrated there during the years 1830 and 1831, with a full determination not to be discouraged by any disappointments of a trifling nature, which the settlement of all new countries are subject, but to persevere until they should reap the fruit of their labor, depending for their supplies on the market of New York, until such times as they could raise their own produce. They continued for about two years, when they were completely disgusted with the country, and left it, carrying with them the very worst reputation of Florida: some returned to their former residence, others proceeded elsewhere.

The fact is that the principles, practice, and seasons of tropical cultivation are as opposite to those of entratropical culture as the climates themselves. Associated enterprise must first form a model of successful vegeculture, and a nursery of supply for tropical cultivation, before any emigrant from the intemperate zone can have the least hope of success.

I could say much more upon the subject, but time will not permit.

Respectfully,

Your obedient servant,

CHARLES HOWE.

Dr. HENRY PERRINE,
Washington, D. C.

DOCUMENT No. 2.

Extract of a letter to the Secretary of State of the United States of America.

CONSULATE UNITED STATES OF AMERICA,
Campeachy, October 23, 1834.

"Finally, and with the fewest possible words, the subscriber most respectfully solicits the attention of the department towards the immediate introduction of tropical plants in southern Florida, and their gradual acclimation throughout our southern States. He is, apparently, the only American consul who, in obedience to the Treasury circular of the 6th of September. 1827, has zealously devoted himself to promote the domestication of tropical plants in the United States, by patient collections and persevering transmissions of very valuable vegetables, and of highly important facts. He has thus shown that the most favorable climate of the tropics, for human health and vegetable growth, does actually extend up to twenty-eight degrees north latitude; that the most tender plants of the tropics are actually flourishing in south Florida; that hence the most hardy plants of the tropics, which profitably propagate themselves in the worst soils and situations, for our actual staples or customary cultivation, will doubtless thrive in similar sites, on the natural surface of tropical Florida; that this unimproved territory will thus sustain the most productive plants for food, medicine, domestic economy, and the social arts, which grow in air or water, on rocks or trees, in miry marshes or moving sands, in the brightest sun or darkest shades, and yield the greatest amount of the comforts and luxuries of physical life, with the least possible labor, and at the least possible price; that, moreover, this tropical district is easily susceptible of great improvement for all forms of vegeculture, and all classes of population,

inasmuch as the same canals which may drain the inundated swamps of their elevated interior, will irrigate the arid sands of its lower seacoast, and furnish water carriage and water power to the cultivators of both; that its geographical position and political government, are superadded motive to divert the emigration of our tropical agriculturists from Texas and Cuba, and the voyages of our consumptive invalids from France and Italy, to tropical Florida; and, finally, that all valuable tropical plants may thence and thus be extended and acclimated throughout our States, at least as far as our improved tropical staples of tobacco, cotton, rice, and sugar. Both the Government and people of the United States have, heretofore, considered tropical Florida to be a sickly and sterile territory, on account of the swamps of its interior, and the sands of its coasts, and hence unworthy of the expense and trouble of surveying and sale; but the subscriber has shown that it enjoys an extraordinary climate, by which it becomes at once both healthy and productive in even its rudest natural state; that it possesses a peculiar formation, by which it may speedily acquire all the additional advantages of a highly improved condition; and that it is hence, alone, extremely worthy of immediate surveying and sale, and planting and population. That population may be speedily composed of those citizens whose persons and property are annually lost to their country, through false representations of the value of the earth in Texas, and of the air in Italy; by showing them the great superiorities for wealth and health combined in the climate, the formation, the position, and the Government of southern Florida. As the humblest sectarians of New York have greatly promoted the public health and their private wealth, by the laborious propagation of the ordinary extra-tropical medicines alone, so the feeblest settlers of southern Florida may combine much more extensive public humanity, with much more profitable private utility, by the easier reproduction of the extraordinary inter-tropical medicine alone. As the genuine species of medicinal plants are now nearly exterminated in tropical countries,* and as the valuable lives of numerous citizens are hence annually destroyed by noxious substitutes imported under similar names, public philanthropy also should aid private enterprise in the immediate introduction of the salutary medicines to tropical Florida. But, as the enjoyment of corporeal and mental health are still more important than the remedies of material and moral disease, derived in general from physical and intellectual adversity, the preservative prosperity of mind and body, by banishing poverty and ignorance from society, is the principal aim of modern philanthropy. Yet, among all human suggestions to improve the social condition, by promoting individual wealth and intelligence, the subscriber has not seen any which approximate in value to the simple indications of Divine Providence itself, in creating many productive perennial plants, which profitably propagate themselves in the worst natural soils; and which are much more productive when aided by the least care, capital, skill, or labor of man. Hence the tropical plants, by him recommended for immediate domestication in tropical Florida, and gradual acclimation in the extra-tropical States, combine the merits of yielding the greatest possible products, with the least possible labor, in the poorest possible soils; and hence their introduction will be an equivalent to the direct addition of

* The natives collect the plants while flowering, and hence there is no spontaneous reproduction by seeds.

absolute fertility to the most sandy, stony, and swampy surface, or hitherto most sterile districts, and of positive wealth to the youngest, oldest, and feeblest, or hitherto poorest population. Although the department may have agreed with the books, that the palms compose the most interesting and most valuable family of plants in the world, yet, without personal opportunity of corroborating their testimony, it will be difficult to form an appropriate conception of the great and varied utility of the different parts of a single species, from germination, through maturity, to death. Even after seeing all that may have been written on the cocoa,* jaggery,† palmyra,‡ morrichi,§ and gomuty‖ palms, the distant reader can scarcely credit the certain result, that a single month, employed in planting any one of these species, will ensure more certain wealth to the laborer, and more lasting prosperity to his posterity, than a whole life of toil in regions where these trees have not yet arrived.

But as the colored natives of the tropics have neither machinery nor management, nor desire to abridge the stupid labor now wasted in the mere collection and preparation of the spontaneous and abundant products of these hardy plants, how much more profitably will they be cultivated by the hands and heads of our white citizens in tropical Florida? Under the governing principle of our popular Government, "the greatest good of the greatest number," the subscriber has also especially recommended the most valuable species of the very hardy families of plants, botanically called Euphorbeæ and Cacti; and of the natural order of liliaceous plants, called coronariæ, by Linnæus, which includes the suborder Bromeliaceæ, or pine-apple tribe of modern botanists. Although in the first (Euphorbiacæ) the farinaceous roots of the cassave (Jatropha manihot) have been greatly eulogized by all reflecting observers, the subscriber believes that his pen has been usefully employed in calling public attention towards its cultivation in civilized countries, by a letter to the Secretary of the Treasury, intended to show, that with much less labor and capital, they will produce much more farinaceous nourishment than any other roots or grains in the world!

Among various other profitable plants of the same hardy family, especially recommended by him, those which yield Indian rubber or caoutchoc, (Siphonia elastica, Castillea elastica, &c.,) are daily becoming more and more important to mankind; and the artificial propagation of them has even been begun by the worst variety of the white species of mankind for vegecultural improvement, the Spaniards in the island of Cuba. Among the Cacti, or hardy family of the prickly pear, he has long called public attention towards the cultivation of the cochineal nourishing species, which, with the breeding of the insects, is now becoming a lucrative business to old Spain itself, in spite of its civil, religious, and military misgovernment. Many species ought to be transferred to Florida on account of their very delicious fruit alone; especially the "tuna de alfayajuca," so celebrated in the city of Mexico, and the pitahaya or strawberry pine apple of Yucatan, which, bearing abundantly from the middle of June to the present date, has probably prolonged the life of the subscriber. Other species insure food to man in periods of the greatest scarcity, and fodder to domestic animals at all times, on the most barren surfaces. Various species also afford impenetrable hedges for fields; formidable outworks around forts; and even boundary walls between nations. As we have various species of prickly

* Cocos nucifera. † Carryota urens. ‡ Borassus flabelliformis. § Mauritia flexuosa. ‖ Gomutus saccharifera—Arenga saccharifera, vel Saguerus Rumphii, vel Borassus gomutus.

pears in Florida, the sites of the useless indigenous kinds can be profitably occupied by the useful exotic species of Spanish America; many of which have run wild in the eastern hemisphere, and have become important articles of economical vegeculture in southern Europe. In referring to the hardy order of liliaceous plants in general, and to the suborder of pine applelike plants in particular, the subscriber passes over the luscious fruits of species which ascend among the prickly foliage of otherwise sterile sands, to recall the attention of the department to the foliaceous fibres of many others, which do not even need any other enclosure than they themselves afford on naked rocks or arid sands. His numerous communications contain indisputable testimony of the immense value of the peculiar species of fibrous Agaves, cultivated in Yucatan, whose fresh leaves yield the foliaceous fibres called "Sisal hemp;" and of the great importance of their immediate domestication in Florida; were it for no other purpose than the absolute necessities of our navy alone. He nevertheless recommends the speedy introduction of afew individuals of every other species of endiogenous plants which are valuable on account of the quantity or quality of their foliaceous fibres, in order to have the relative properties of all determined in a civilized country. He therefore respectfully directs the attention of the department to the various genera of Agave, Aloes, Bromelia, Yucca, and Phormium: of Pandanus, Musa, and Helicornia; and of the Gomutus, Mauritia, Bactris, and of the other genera of palms; and to the places and habits of growth of the species of each genus in every family which are most productive of the most valuable foliaceous fibres; as it continues to be his unshaken opinion that the production of foliaceous fibres by civilized people should be directly encouraged by the statesmen of our nation and the philanthropists of the world. Lighter, stronger, more elastic, and more durable, than the cortical fibres of hemp and flax; and produced by perennial self-propagating plants in stony, sandy, or swampy surfaces, with the easiest and cheapest cultivation, and the simplest and speediest preparation, the relative and positive prices and properties of foliaceous fibres, insures their substitution for cortical fibres in the general consumption of mankind.

I have the honor to be,
Sir, very respectfully,
Your obedient servant,
HENRY PERRINE."

CONSULATE UNITED STATES OF AMERICA,
Campeachy, November 23, 1834.

SIR: In resuming the topic of tropical plants unconcluded in the last communication of the 23d ultimo, the subscriber has the satisfaction to add to the section on foliaceous fibres, a reference to pages 165—6, of the recent "Memorias de la Institucion agronoma de la Havana, par Don Ramos de la Sagra, 1834." This gift, with a letter from the author, dated the 3d of October, arrived the 3d instant, and extracts from both should have accompanied the *second* communication to the Secretary of the Navy.* intended to be a supplement to the *first* on foliaceous fibres, directed to that department

* They will still be sent, and it is respectfully desired that they may be read also by the Secretary of State.

on the 10th ultimo. From the spirit with which the professor has adopted the opinions of the subscriber; from the favorable circumstances in which he is placed to prosecute the enterprise with Governmental aid; and from the enlightened policy recently adopted by Spain, it is not improbable that, as she was the first nation to avail herself of the services of one foreigner to open a new world of mineral wealth to Europe, she may also be the first to avail herself of the suggestions of another foreigner to open a new world of vegetable wealth to both hemispheres. In the royal botanical garden at Havana, she is introducing and propagating all useful vegetables of all tropical regions of the globe. In the royal pattern plantation lately established near it, she is giving gratuitous instructions in practical agriculture by the improved cultivation of all valuable species, both indigenous and exotic, which may be profitable to the island of Cuba. The best kinds thus domesticated, she is transporting to acclimating nurseries in the Canary islands, whence after intermediate acclimation, they are conveyed to acclimating nurseries, in southern Spain, for gradual acclimation throughout the peninsula. One of the important results is already seen in the profitable propagation and preparation of the cochineal plant and insect of Mexico, in the ancient mother country; and the indigo plant of Guatemala, is also travelling gradually to be cultivated and manufactured by the poorest laborers of old Spain, with the improved process of extracting the dye by simple infusion of the dry leaves. For the single service of thus extracting the coloring material and manifesting the superiority of the process, and the product, Professor Sagra was honored and rewarded by a special decree of the King, and was appointed sole projector and director of the acclimating garden and pattern plantation, with all the funds and laborers requisite to render them of the most extensive practical utility. If, for the infinitely superior services of the subscriber, in solely the discovery and extraction of *foliaceous fibres*, he should be honored and rewarded by a special decree of Congress, establishing under his direction, a national acclimating nursery, near Cape Florida, he would consider himself amply indemnified for all his sufferings during the last seven years, and his utmost, his only ambition would be completely gratified, as he is firmly persuaded that a few thousand dollars thus employed, would be more productive of permanent prosperity to his country, than many millions bestowed in any other way. In reference to Sisal hemp alone, until the present Secretary of State shall have attentively weighed all the facts and arguments alleged by the subscriber in favor of its production in the United States, he earnestly begs that his opinions may not be deemed extravagant or absurd, when he repeats his unshaken conviction, that its introduction will make an era of as great importance to the agricultural prosperity of our confederation as the invention of the cotton gin: that, as the *narcotic leaves* of *one* native plant of Yucatan (which *did* take its name from the dependent province of Tobasco) do actually afford an annual exportation of nearly six millions of dollars, so the *fibrous leaves* of *another* native plant of this peninsula, (which *may* take its name from the exporting port of Sisal) will more probably afford an annual exportation of six times six millions of dollars, with a greater proportionate profit to the cultivators, than even the fibrous pods of another native plant of the tropics, which needs no etymological allusion to its name, since it affords more than one-half of the whole exportations of our country. In returning again, as briefly as possible, to the profitable propagation of productive plants in tropical Florida, on its poorest soils, the

subscriber respectfully reminds the department, that the successful experiments at Rio Janeiro have demonstrated that the tea plant of southern China will rapidly arrive at maturity in the arid sands of any tropical climate: and that their plucked leaves are speedily prepared for exportation by the most simple apparatus and the most ignorant laborers. The absurd stories heretofore told about the different and difficult processes of drying the leaves, and the extremely troublesome and tedious manipulation of rolling them, adapted only to the starving, cheap labor of a Chinese crowded population, have been all positively contradicted by the personal observation of respectable Americans, in Brazil; and for the intelligent testimony of, probably Dr. Dekay, the department is respectfully referred to the New York Farmer, for 1828, pages 105–7. We thus arrive at the important general result, that the only tedious operation from the planting of the slips to the selling of the tea, is the light labor of the feeble in sex, age, or health, to pick and assort the successive crops of the green leaves; that one man may cure and prepare for market the entire produce of sixteen acres; that the plants of two feet high, four feet apart, will yield an annual average of three pounds of leaves, or upwards of eight thousand per acre; and that hence, attaching the highest value to American labor of all ages and sexes, and abilities, the production of tea, at even one-half of the price of solely the average duties yet added in our ports, or fifteen cents a pound, will afford much more profitable employment to American capital than any actual branch of American agriculture..

But there is another plant and product of the East Indies which can be so much more profitably propagated in our tropical territory, than even in our warmest extra-tropical districts, that our coldest States are actually sinning against the now established policy of the nation, and against the future prosperity of their own citizens, in continuing their war against nature to force the domestications of the many-stemmed mulberry tree of Manilla, and the tender silkworm of southern China, although not more than one crop of cocoons will be the average annual reward of their mistaken labors. In Guadaloupe, the French Government sustains an establishment of 40,000 plants of morus multicaulis, and from experiments made in that island during three successive years by Dr. Memnier, of the royal navy, and repeated in Cuba, by Professor Sagra, of the royal botanical garden and pattern plantation, near Havana, it is demonstrated that ten successive crops of cocoons every year, may be obtained from the perpetually unfolding leaves of this valuable exotic in tropical climates, and consequently in tropical Florida. Let, then, New England send to this productive climate only one-tenth of her surplus population now unprofitably employed in the production of cocoons, and she will thus insure to the other nine-tenths in their wintry home, a much more profitable employment in the manufacture of silk alone. It remains to be decided by our civilized citizens whether it will be still more profitable to propagate the social silkworm of the evergreen oaks of the forests by Vera Cruz, which spin cocoons of two to eight feet long!!

One species of the indigo plant grows wild in the barren soils of Florida, and in the southern divisions will yield four crops a year; by adding different species which mature at successive periods, the annual quantity collected may be increased to an indefinite amount; the many leaved species of Senegal which flourishes on the dryest sites in the dryest times, seems destined to form as important an auxiliary to the production of indigo, as the many-stemmed mulberry of Manilla has proved to the production of silk.

The substitution of infusion for fermentation of the plant, has rendered the extraction of the dye, a light, simple, brief, cheap, and healthy process. What more could be said to prove that indigo may now be profitably produced there, by our poorest families, for home consumption and the foreign market.

As many years, much labor, and more money have been spent in voluminous writings and fruitless experiments to acclimate the wine grape of Europe in the United States, and Government has even repeatedly condescended to grant to foreigners certain tracts of our richest soils to encourage the introduction and promote the culture of the vine, which bears but one uncertain crop of fruit each year; how much more worthy of the labor of individuals and the bounty of Government, the enterprise of domesticating on the poorest calcarous surface of tropical Florida, the "*uva de todo tiempo*," or everbearing grapevine of Campeachy, whose clusters of fruit ripen every month in every year. The natural coffee trees of the poorest soils of Arabia yield the finest flavored grains from fallen berries of complete maturity; and the pulpy portion of these coffee cherries is there converted into a commercial drink, which may be profitably distilled into spirits. The artificial coffee bushes, of the richest soils of the West Indies, yield larger grains of inferior flavor, extracted from picked berries rarely entirely ripened; and the pulp is thrown away, or used as manure. But, as even the Spanish planters of Cuba have lately begun to discover that it is more profitable to shake four or five pounds of fine flavored coffee from unmutilated trees on arid sands, than to pick four or five ounces of bad flavored coffee from mutilated bushes in vegetable loam, it is hoped that our poorest people, who, in preserving the pits of peaches for sale are not guilty of using the pulp for manure alone, will also soon discover that the coffee tree may be a profitable companion of the tea plant in every yard or garden of southern Florida. In the recent history of the island of Cuba, Professor Sagra proudly boasts that the fine flavored tobacco of Havana is an exclusive product of that island; yet, as by his own showing, the flavor depends solely on natural peculiarities of small and distant portions of its surface, all that is necessary for its successful growth in south Florida is the selections of the same kind of soils. As the subscriber limits himself to brief notices of such plants as may be profitably produced by our poorest people on the poorest and unimproved soils of tropical Florida; and as the profitable productions of sugar require large capitals and rich vegetable loam,* he will merely remark, that on the drained marshy interior of that Territory it can be produced at so low a price as to become a profitable article of exportation to the torrid zone itself. In addition to our tropical rice, tropical tobacco, and tropical cotton, which continue to be consumed in tropical ports in spite of enormous duties and prohibiting laws, although raised in our extra tropical Territory, he incidentally adds, that, from statistical data, it may be demonstrated, that the surface of our peninsula alone is sufficiently extensive to yield a greater quantity of all tropical staples than is at present exported from all inter tropical regions of the world. The black pepper plants of the East Indies, introduced at Cayenne, were propagated with such extraordinary

*February 22, 1838. The subscriber does not believe that it is either practicable or desirable to have great plantations of great staples in southern Florida. Every family of small cultivators, on small farms, may, however, raise tea, coffee, chocolate, and sugar, &c., for family consumption; and the small surplus for sale will make a great aggregate for the home market of the other States; in the same way that apples, cherries, currants, &c., are supplied by the farmers of the north. H. P.

perseverance by General Bernard, that nine years ago, his estate alone contained more than thirty thousand maturing vines, estimated to yield four or five killogrames each, of pepper, for exportation. In Florida, one species is indigenous, and therefore offers more hopes for acclimating its brethren.

The black pepper vines may be economically trained on fruit trees, as are the grape vines in Italian orchards; and thus the fruit (whose goodness depends entirely on the natural properties of the soil) may be obtained much cheaper than in the native or naturalized countries of this vine, where it is sustained by withered poles or worthless trees. The betel pepper vine may also be propagated in tropical Florida, because "such is the consumption of the betel in the east, that it occasions a branch of commerce nearly as extensive as that of tobacco in the west;" and because our superior people, under our superior institutions, can cultivate, at the highest rate of labor, any product much cheaper than the inferior races under the misgovernment of the tropics, at the lowest rate of labor, even should it not exceed three cents a day. The same remarks will apply to the production of the kindred roots of the common species of ginger, turmeric, and arrow root; and with still more force to the superior species not generally known, by contrasting the results of their improving cultivation by civilized agriculture with the quantity and quality obtained by the deteriorating culture of uncivilized hands. The medicinal aloes will thrive in the most dry and barren soils, "may be planted at any season of the year, even in the driest, as they will live on the surface of the earth for many weeks without a drop of rain;" are set out like young cabbages in rows of one foot apart, at five or six inches from each other; require no other trouble than weeding only until their own leaves become large enough to shade the ground; may be cut the first year, and will continue productive from ten to fifteen years in succession. The same observations are applicable to the propagation of the hardy kindred plants, the henequen Agaves of Yucatan; the pulque Agaves of Mexico, and the pine-apple bromelia, of Peru; with the exception that the last are placed about three feet apart, and do not generally yield their luscious fruits before the third year. The second are planted about five feet apart, and do not yield the celebrated juices of their developing stems under five years; and the first, when transplanted at a yard high about two yards apart, will yield the abundant fibres of their fully developed leaves at the end of the second year.

Omitting further references to plants *cultivated in the sun*, the subscriber invites the attention of the department to some brief notices of valuable vegetables which are *propagated in the shade*. The sudorific roots, called sarsaparilla, of a prickly climber, which is a brother of our sweet briar; the purgative roots, called jalap, of a creeping vine, which is a half-brother of our sweet potatoe; the emetic root, called ipecacuanha, of a small shrub which is a relation of common coffee; and the tonic bark, called Peruvian or cinchona, of a large tree, which belongs to the same family, all flourish in the thickest forests, and would continue to propagate themselves by their ripe seeds, did not the improvident natives collect them when the plants are in flower: and hence it is respectfully suggested, that it is a moral obligation of our Government to transfer a few individuals of every valuable species of all tropical medicines, to propagate themselves with safety in tropical Florida. The propagation of the parasitical vine, which yields the odorous pods called the vanilla bean, in the forests of Vera Cruz, is not entitled to the name of agriculture, as it is effected simply by tying slips to

the trunks, or dropping them at the roots of any tree in the woods. The istle of Goazacoalcos, or the brother of the pine apple, whose thin, narrow, long leaves, yield the foliaceous fibres called pita, a superior substitute for flax, needs no other preparation for their self-propagation than clearing away the undergrowth of the forests.

The celebrated gomutus palm, which grows wild in the swampy woods of Sumatra, and yields 4 to 6 pounds annually of the black horsehair-like fibres, called ejoo, besides sago, wine, sugar, thatch, &c., and was considered by the British Government to be the most valuable substitute for hemp, discovered by the distinguished and favored Dr. Roxburgh, and was, therefore, propagated extensively in the dominions of the East India Company. The Mauritia flexuosa, or the marriche palm, of the islands of the delta of the Orinoco, which are overflowed by the inundations of the river half the year, and by the tides of the sea twice a day during the remaining six months, nevertheless yields all the vegetable materials for building, for furniture, for domestic utensils, for clothing, for food, and for drink, which are necessary for the comfortable existence of man. The trees, which yield abundant substitutes for bread, for butter, and for milk, will all propagate themselves in shady groups or on arid soils. Even the cultivated chocolate-tree will perish, unless protected by the shade of other trees, and can hence be propagated in the marshy woods of tropical Florida. The tien palm, growing wild in marshy spots, furnishes to the indolent Brazilians an equivalent to the grape in the pulp; and a miniature cocoanut in the stone and kernel of its clustering fruit; and in its very fibrous leaves a superior substitute for flax and hemp. (Without multiplying the list, enough has been said to show that even the uncleared, unimproved lands and swamps of southern Florida, may be profitably employed in the propagation of tropical plants.) The Sagus farinifera, or sago palm, "is an inhabitant of only low, marshy spots. A good sago plantation or forest, is a bog knee deep." Five or six hundred pounds is no unusual quantity of nutritive matter afforded by a single tree; but taking the least average at 300 pounds, and allowing even 15 years for complete maturity, a single crop will be equivalent to 8,700 lbs. per acre of annual supply of farinaceous matter. As the pimento tree of tropical America, and the cinnamon tree of tropical Asia, are disseminated in the most extensive forests, and in the most impassable jungles, by birds and beasts alone, it may be safely predicted, that if a single plant of each should come to maturity in tropical Florida, they will both be ultimately so spread over the whole peninsula, that our children will hunt for wild alspice as anxiously as they now seek other wild berries; and that our cattle will eat the aromatic leaves of the laurus cinnamomum as greedily as they now devour the "sweet leaves of the Hopea tinctoria." Cloves grow luxuriantly in a sterile soil, composed of yellowish or reddish clay; and although, in the West Indies, the sun is admitted to them after the first year, yet it is probable that they would flourish still better in shades analagous to those of their native forests; and as nutmegs are disseminated by the wood pigeon, the same remark may be extended to them, although they are cultivated successfully in the sun of Trinidad. The more delicious fruits of the tropics also run wild through the forests of every tropical territory into which seeds and plants are introduced by accident or design. The honest Bernal Diaz tells us, that while detached in Goazacoalcos, he found nine orange seeds in his trunk, which he planted by the side of the temple in which he

lodged; and that the native priests, perceiving that the plants were new, carefully attended their growth, (a strong evidence of the great civilization of the Mexican Indians of that period.) The progeny of these oranges are now found wild in the woods of almost every State of Mexico. Thirty-seven years ago the first mango stones were brought from Jamaica to Campeachy, and the first tree is still flourishing at a great height in the suburbs of Saint Roman. At present, many fine varieties of this delicious fruit are spread all over Yucatan and Tobasco, the greatest number by accidental propagation. At a still later period, a few grains of Guinea-grass were brought to this peninsula, and has now so overrun the lots and yards of the suburbs, as to be considered an objection by recent purchasers. Spondias are so "easily increased by cutting, that if a branch, ladened with young fruit, be set in the ground, it will grow, and the fruit will soon come to maturity. In St. Domingo, they make hedges of the boughs, which flower and bear fruit in a few months. The inhabitants of extra tropical climates, generally believe that oranges and pine-apples are the most delicious fruit of the tropics; but travellers, and natives generally, concur in placing far above either, the best varieties of the mango, the durion, the cherimoyer, and, above all, the mangosteen. While some consider the durion to be one of the most delicious productions of nature, others give the cherimoyer the reputation of being the finest fruit in the world, next to the mangosteen; and all suppose that the equal of the latter does not exist. The sapotes mameys, &c., compose a genus (Achras) of fruit-bearing timber-trees of the forests of tropical America, which merit propagation for the value of their wood alone. So the forest trees, valuable in the mechanical and chemical arts, after being cut, combine the additional merits of beauty and utility, or both, while growing. The cedar of Barbadoes, so noted for the size of its trunk; the habi of Campeachy, (piscidia erythina,) which is prized in Yucatan for ship-building, more highly than the live-oak of the United States, or the teak of the East Indies, are both rapid growing and highly ornamental trees, (as well as mahogany,) in the most stony and sandy soils. Brazilletto and logwood form beautiful and excellent hedges; and the arnotta shrub is a handsome decoration for gardens. Without multiplying the list of valuable plants which will propagate themselves, or be spread by winds, beasts, and birds, over extensive forests, in every tropical territory to which they may be carried, by accident or design, enough has been said to show, that even the natural, uncleared sands and swamps of southern Florida, may be profitably populated with tropical plants. As, however, the species of musa, which yields the plantain and banana, are self-propagating natives of shady and humid situations, it is in order to add that if, indeed, other species of the same genus, or of the family genera of heliconia, urania, or strelitzia, should also yield the fine fibres* of which the most delicate muslins of India are prepared, and the coarse fibres called Manilla hemp, of which our strongest cordage is made, they will combine the merits of yielding much more food and fibres, with much less labor than any other plants in the world; and that the introduction of the useful species of this most productive family

* I am now satisfied that fine fibres can be profitably obtained from the lamina of the stalks of certain species of banana; but am still doubtful relative to the precise species called abaca, which yields the Manilla hemp. H. P. 16th Nov., 1837.

in south Florida, is much more worthy of a special voyage of one of our largest vessels, than was the introduction of the celebrated bread-fruit tree in the West Indies. In proportion to the gradual propagation of valuable tropical plants throughout the forests of tropical Florida, the useless native undergrowth and trees, may be as gradually extirpated from the ground, and the cleared and improved surfaces as gradually occupied by the remaining valuable tropical plants which flourish best in the rays of the sun. It will be the work of years, it is true; but with us, it need not be a work of many years. With our industrious people, under our free institutions, much more formidable enterprises have been promptly executed, whenever they became objects of national policy or of popular desire.

The course of the Gulf stream and the origin of St. John's river indicate that the southern division of Florida is more elevated than the northern, and the swampy interior of southern Florida is more elevated than its sandy shore. Hence, cheap canals may easily be cut from the longitudinal centre to the parallel coast to drain the inundated swamps of the interior, whose consequent value for the production of sugar alone would amply reward the capital thus expended. These same canals would constitute lateral channels of communication and transportation between the great natural canal of the peninsula, the St. John's river, and the great natural canal of the ocean; the Gulf stream and these very same canals would, at the same time, furthermore convey a sufficient surplus of water with sufficient descent to propel powerful machinery, and to irrigate arid sands on their route. The cultivators of the drained swamps, as well as of the irrigated sands, could always command the most appropriate quantity of moisture for every variety of their respective soils, and for every species of their peculiar staples; and hence their vegeculture would be much more certain, prolonged, and productive, than can be the agriculture of any territory which is dependant on the clouds alone.* Looking forward to the period when tropical Florida shall be thoroughly improved and highly cultivated—when its forests shall be filled by the most valuable vegetables which delight in the shade, and its fields shall be covered by the most profitable plants which rejoice in the sun—when it shall combine all the material and mental enjoyments of which it is susceptible, from the benignity of its climate, the peculiarity of its formation, the proximity of its position, the character of its people, and the form of its government, we may safely predict that, in population, wealth, and happiness, it will greatly exceed every other equal portion of the world. These views may be considered visionary by the department, and will be ridiculed by almost every citizen of the United States who may not have resided long enough in the tropical regions to appreciate the immense natural advantages of their climate, and the equally immense political disadvantages of their government. The subscriber, nevertheless, does not desire any greater honor than the power of passing the brief term of his painful existence amid the privations and exposures incident to a chief pioneer in the planting and population of tropical Florida. If the swamps and sands of this unexplored district be as sickly and sterile as they are generally supposed to be, the grant of a portion of this worthless Territory cannot be of any loss to our Government; and if the grantee can show or cause them to be both

* In tropical climates, moisture is the substitute for manure; and hence cultivation consists in irrigation. H. P.

healthy and fertile, and therefore valuable to himself, his associates, and his countrymen in general, he should be entitled to them for the discovery or the labor. While Government continues to recommend the gratuitous distribution of more inviting lands to actual settlers, and while Texas continues to bestow a league of 4,280 acres of fertile soil to every family, it will be difficult, it is true, to attract emigrants to southern Florida by even the unconditional gift of a section of 640 acres of swamp or sands to every occupant; yet the subscriber continues firmly persuaded that the facts and arguments relative to the climate, which he can offer with the legal divisions of the conditional grant solicited by his memorial of the 6th of February, 1832, will induce an adequate number of individuals to engage with him in the propagation of tropical vegetables; and he attaches still greater importance to the law itself than to the land it may insure, as, by by indicating a favorable opinion of his services and suggestions, it may have a recommendatory value to attract also a sufficient amount of capital to accelerate and extend the enterprise. As southern Florida is not yet surveyed, nor offered for sale, and as many portions of its surface are covered with conflicting claims, a special act of Congress is absolutely essential to insure the right and safety of locations in any part of the Territory; and the subscriber cannot, in any other way, acquire the power of combining unity of design with strength of co-operation and perseverance in the pursuit, with the right of selecting the land, electing his associates, and directing their cultivation of the most productive plants. As Congress has repeatedly granted to various foreigners, and their associates, certain tracts of productive soils in populous parts of sovereign States, to encourage objects of partial utility, although the grantees had not rendered any previous services whatever, and as the subscriber is desirous to avoid any further obstacles or delay from Congressional scruples, corporate insensibility, or political hostility, in the modification and passage of the bill H. R. No. 555, of the 25th of April, 1832, he now merely solicits, on similar terms, an act of sale or conveyance to a native American and his associates of an equivalent portion of unproductive lands in the desert extremity of a subject Territory, to encourage an enterprise of the most extensive utility ever proposed by a humble citizen of the United States; although he has continued to render highly important services during the last seven years, by the careful collection and transmission of very valuable vegetables, and of still more valuable facts, at a great sacrifice of wealth, labor, and health, which would not be compensated by the price in money of a township of our most fertile soils.

In connexion with the domestication of tropical plants, the subscriber has discovered, or developed, in the unappreciated climate of the southern section of the land of flowers, a fountain of human health, and a mine of vegetable wealth; and in the sterile districts of the southern sections of the Atlantic States, a natural preventive of State nullification, and a superior substitute for a national bank, which will save the lives of our sickly voyagers to southern Europe; prevent the emigration of our healthy agriculturists to southern America; extract riches from the ruined fields and refuse lands of our southern States; afford employment to the surplus capital and laborers of our northern States, and thus preserve and promote the peace, population, prosperity, and permanence of the Union. In the letter of the subscriber of the 1st of February last, he briefly adverted to a few tropical plants which may be propagated in the most sterile districts of

the southern States much more profitably than the common staples can be cultivated even in the most fertile districts of the southwestern States. Mental and corporeal exhaustion prevent his noticing various other valuable vegetables, with appropriate details, in the present communication; and he will, therefore, merely refer to the three Mexican plants and the one East India palm then mentioned. By recent papers from the United States, he perceives that John Cowper, Esq., of St. Simons, has on his plantation about fifty mature date trees; a fact which strengthens his opinion, that all the valuable species of palm, by gradual acclimation through Florida, may finally reach, at least, the northern limits of our palmetto. Limiting, however, our attention to the jaggery tree, (Caryota urens,) or the sugar palm, from which the greatest quantity of sugar is obtained, in the poorest soils, by the poorest hands, at half the price of cane sugar extracted from the richest loams, by the wealthiest planters, with the greatest skill and the best machinery, it appears that the sugar palm may be propagated much more profitably in Georgia than the sugar cane in Louisiana. By the Jamaica papers, published during the progress of the emancipation act of the British Parliament, it appears that even the abolitionists themselves relied much more on the production of the palm sugar than on the cane sugar, by the free labor of the poor, indolent, and ignorant natives of the East Indies, to supply the amount heretofore furnished by the forced labor of the black race, with the skill and capital of the white race, in the West India islands. The final passage of this destructive law, affords tacit evidence that the British Government itself was greatly influenced by the considerations in favor of substituting the sugar palm. Every person tolerably acquainted with the character and condition of the colored natives of the torrid zone, is aware of the fact, that their voluntary labor, however cheap and abundant it may be, will never produce, cheaply and abundantly for exportation, any staple which needs the combination of industry and intelligence, and capital and machinery. Even the production of cold-pressed castor oil in Yucatan, where the seeds are merely collected from wild perennial trees, is so trifling and so dear, that the principal consumption of Campeachy is supplied by the oil of Illinois, obtained from the seeds of cultivated annual plants, and augmented at least a hundred per cent. in price by the expenses and duties on its route. But the excessive indolence and improvidence of all the colored species of the human genus, between the tropics, is most strikingly shown by the fact, that famine occurs more frequently in this productive zone than in the most unproductive regions where the white species reside.

During the nearly eight years that the subscriber has held his office, the tropical State of Yucatan has at least four times suspended its prohibitory laws, and permitted the entrance of tropical rice and tropical maize from our extra-tropical southern and southwestern States, to save its indolent inhabitants from absolute starvation. Hence, whenever any colored native of the tropics takes any pains to aid the propagation of any plant around his dwelling, it may be safely inferred that it yields a greater product, with less labor and skill, than any other vegetable with which he is acquainted; and hence the preference given in the East Indies to the jaggery palm over the sugar cane, (which have both been equally known from time immemorial,) is the strongest possible argument with the subscriber in favor of the cultivation of the former, and the manufacture of its juice by a free white civilized people. Hence, also, when a tropical

tribe have merely transferred a single species of any vegetable to the vicinity of their huts, it may be safely pronounced that, of all plants known to them, it affords the most certain and easy resource against famine, when unsuccessful in fishing or hunting, the first and favorite pursuits of all idle gentlemen, whether civilized or savage, in every part of the world. Thus may be conjectured the value of the Jatropha manihot, whose roots have furnished the only vegetable material for gluttony and drunkenness to various tribes of the woods and plains of South America; and from the data acquired by the subscriber, he is induced to believe that farinaceous matter may be extracted from the roots, in the most sterile districts of our southern States, much more profitably than from the grains of the most fertile districts of the western States. In the same way may be deduced the superiority of the production of the *coarse* foliaceous fibres of the cultivated *Henequen* Agaves of the fields of Yucatan, and of the *fine* foliaceous fibres of the propagated *Istle* Bromelias of the forests of Goazacoalcos. Although fibrous-barked plants abound in all parts of tropical America and their cortical fibres can be more easily extracted than flax or hemp, the subscriber believes that no place can be cited in which fibrous-leaved plants can also exist, where the natives do not give the preference to foliaceous fibres. In the statistics of Vera Cruz, published in 1834, it is stated that, although the soil and climate of Goazacoalcos is not surpassed by any in the world for the growth of cotton, the production of these capsular fibres has nearly ceased since the natives have had liberty to select their labor; while, on the contrary, the production of the fine foliaceous fibres, called *Pita*, of the forest plants, called *Istle*, are augmenting every year. In the year 1830, there were found in the vicinity of seven small Indian villages in that district, 1,221 istales, *i. e.*, istle patches; and there was reported, solely by the pass of St. Juan, for the port of Vera Cruz, an exportation of 943 bales of pita, of 200 lbs. each, 188,600 lbs.

As the natives never receive any article in return but silver, and as they never spend any money they receive, (their cloths being made by their women, and their intoxication being effected by the "chicha," fermented from their own maize,) it is calculated that, since the first notice of the exportation of their fibres, their predecessors must have buried, of their value alone, a total amount of 2,825,000 dollars, which have never been of any value to their ancestors nor themselves, and may never be of any utility to their posterity or the world. From the abundant data already communicated by the subscriber, it may be calculated that foliaceous fibres of the Henequen and Istle alone, may be produced in the barren sands and in the idle woods of the south, much more profitably than the cortical fibres of the hemp and flax can be cultivated in the fertile fields of the west; than even the capsular fibres of cotton in the rich alluvions of the southwest. If South Carolina will even cultivate her indigenous Yuca filamentosa, he will promise to her, with the rotary scrapers of Perrine, to separate foliaceous fibres from its green fresh leaves, a gift as favorable for her agricultural prosperity, as were the rotary pickers of Whitney to separate capsular fibres from their ripe dry seeds; and as the profitable production of foliaceous fibres will constitute a legitimate remedy for her agricultural distress, so will it prove a natural preventative of her State nullification. Indeed, the principal cause of the agricultural distress of the sterile districts of the old southern and northern States, is the extended cultivation of common staples in the fertile districts of the new southwestern and western States:

and as the completion of canals and railroads between the loamy banks of the western rivers and the sandy shores of the Atlantic Ocean, will still further reduce the price of the present products of the planter of the south, and of the farmer of the north, their most effectual legitimate remedy will be found in the cultivation of such new staples as may be most profitably cultivated in each natural variety of their respective climates and exhausted soils, and hitherto uncultivated lands. The useless species of the prickly pear, which overrun our barren sands, may be profitably supplanted by their useful brethren of the tropics; especially by the prickless nopal, or cochineal cactus, which nourishes the precious insect, whose growth and propagation affords a pleasant and profitable occupation to the feeble in health, sex, and age; and yields, in its scarlet fruit, an agreeable food for man; in its fleshy masses, a fattening fodder for animals; and in the full-grown plants, a beautiful and effective fence for other objects of cultivation. Foreign commerce no longer affords profitable occupation to the ships and mariners, nor factory facturers to the machinery and operatives of the north. Of railroads and canals to the west and southwest, more will be completed than will find remunerating freight to and from the Atlantic shores; yet all will open additional channels for the natural current of our wealth and populations, to the fertile valleys of the Ohio and Mississippi. The additional surplus of laborers, and of funds which may shortly be let loose from the great canals, and from the national bank, will swell the great stream of emigration, and, however the new States, as masses, may be benefitted by the influx of money and inhabitants, their actual farmers and planters, as classes, must be injured by over-production of their common staples; and the cultivators of the same staples in the old States will be absolutely ruined. To avoid the evils of over-production of the actual staples of agriculture in the only fertile districts of the confederation, where they can still be grown with a moderate gain; to ensure a natural equilibrium between the four great divisions of the nation, with a profitable dependence on each other under a revenue tariff; to afford a gainful occupation of the ruined fields and refuse lands of the south, which will constitute a natural preventative of the motives of State nullification; to furnish profitable employment to the surplus capitals and extra laborers of the north, which will form superior substitutes for the operation of national banks,* the subscriber has long proposed the immediate introduction of new branches of agriculture—the extensive cultivation of such tropical plants as combine the merits of yielding the greatest possible products with the least possible labor, in the poorest possible soils! He repeats, that the domestications of such plants in the southern States, will be an equivalent to the direct addition of absolute fertility to the most stony, sandy, swampy surfaces, or hitherto most sterile districts; and to the actual gift of positive wealth to the youngest, oldest, and feeblest inhabitants, or hitherto most needy population. Referring especially to such productive perennial plants as profitably propagate themselves in the worst natural soils, and which become much more profitable when aided by a very little care, capital, skill, or labor of man, he reiterates that these simple creations of Divine Providence afford much more effective means to promote the wealth, intelli-

* The subscriber's ten years' absence from the United States, and his consequent ignorance of the facts and arguments for and against State nullification and national banks, render him unable to express any decided opinion of the merits or demerits of either. 22d February. 1838.—H. P.

gence, and morality of mankind, than all the associations and suggestions of modern philanthropy, to improve the condition of the poorest members of human society. But, selecting only such species as are most valuable for the production of foliaceous fibres alone, he continues firm in the belief, that the cultivation of these fibrous-leaved perennial plants, will create still greater prosperity in the agriculture of our southern States, and produce still greater revolutions in the manufactures and commerce of the world, than have ever yet been effected by the culture of our fibrous-podded annual cotton.

DECEMBER 9. Were there, however, no other motives for an acclimating nursery at tropical Florida, than the domestication of such species and varieties of rice, tobacco, and cotton as are peculiarly valuable in peculiar soils, and of such as will flourish in sites and seasons where and when the actual species and varieties would perish, such an establishment should be encouraged on that account alone. Understanding that the actual Secretary of State has a variety of the nankeen-colored cotton in cultivation on his plantation, the subscriber now forwards a sample of another spontaneous variety, which is cultivated in Tobasco, with the hope that its relative value may be fairly tried, in all natural varieties of our climates and soils. By ascertaining the precise natural variety of native soil in which any natural variety of exotic plants will become, not merely acclimated, but absolutely naturalized, we ascertain the sections of our surface where it may be most profitably produced, and where, therefore, it should be alone cultivated by the unforced industry of our happy country. He also transmits a sample of the "Algodon de vejuco," or the reported vine cotton of the stony eminences of Yucatan, which may be propagated like hops or beans, and may therefore become valuable for family use, where lands are scarce or poor. He is credibly informed that, on the eastern declivity of the Mexican cordillers, in a department of the State of Vera Cruz, there are some plants of one species of gosspium, whose capsular fibres are permanently red; but the subscriber has not yet been able to obtain a single seed. It may be thought, in other countries, that the retention of this rose-colored cotton by the natives, for domestic use, to avoid the trouble and expense of dying, would account for his inability to obtain the seeds; but the fact is, that a foreigner can very seldom obtain any peculiar plant of Mexico, without a personal voyage to the place of its growth, and a clandestine conveyance to the vessel in which it may be exported. Indeed, the mere fact that any vegetable is desired by a foreigner, induces the barbarous Mexicans to believe that he has discovered in it properties of immense pecuniary value; and to act as if they supposed that his possession of a single variety would give him the power of Aladdin's ring or lamp, to convey off the same genus in the twinkling of an eye. Even in cases where elevated personages have affected to favor the views of foreigners, in the collection of seeds, it has generally been too late discovered that their power of germination was destroyed by boiling, of which a notable example occurred in the seeds of the logwood tree, carried from Yucatan to Cuba. If, seven years ago, the subscriber could have believed the then incredible relation of the extreme barbarity and duplicity of Mexicans, concurred in by all foreigners who had an experience of seven previous years, he should not have sacrificed one-seventh of the health, wealth, and labor to obtain, through Mexican gratitude, that aid in the collection of plants and facts, which could have been much more profitably obtained by

his own hands and eyes alone. If our Government should ever imitate that of France, in sending botanists and agricultural collectors to these countries, the digressions of the subscriber may be usefully recollected in framing their instructions. It should also be recollected that the arbitrary definitions of technical botany retard valuable additions to practical agriculture. To the mere botanist, even the kinds of plants which he absurdly terms "permanent varieties," are too insignificant for special description; but to the actual agriculturist, their nominal varieties are practical species, frequently much more important, for cultivation, than the different species of the books. Relying on botanists alone, we should be forced to admit that the sweet orange tree is merely a permanent variety of the bitter orange tree; and that the innocuous and poisonous species of the cassave plants are mere varieties of each other! Hence, collections should be made of every kind of tropical plants, in every kind of soil, however great may be the resemblance of their external forms, if there be the least difference in their internal organization manifested by the site, situation, or season in which they flourish better than other kinds, with the same vulgar or botanical names. We shall thus find that, under the natural order euphorbiacæ, there are many sorts of very valuable roots, known by the common names of Cassave, Yuca, Manioca, &c., usually reputed mere synonymes of each other; and by the botanical synonymes of Jatropha manihot, Janipha manihot, Manihot cannabinis, &c. It will also thus be ascertained, that botanists frequently engage in very silly disputes, where, although each may be right, all may be wrong; that in relation to the genera of the cassave, the questions have been as idle as would be the argument presented by a long turnip and a flat radish, between persons believing them to be identical roots; and that agriculturists would be infinitely more edified by a statement of the facts, that the manioc of Cayenne requires fifteen months to reach maturity, and that the Yuca of Yucatan ripens in half of the time! The botanical errors of the notorious Humboldt, under the head of Agave Americana *alone*, have occasioned incalculable damages to the world in general, and to the United States in particular. Having seen the species with that name, which has run wild in southern Europe, and furnishes hedges for the inhabitants as far as Switzerland, it appears that he could not find any other species of Agave in all tropical America; and he has, therefore, propagated the general opinion that it is the very same species as the Maguey, which is cultivated on the cool mountains of Mexico, for the inebriating juice of its undeveloped stalk, called Pulque, or Mexican wine; and as the Henequen, which is cultivated in the hot plains of Yucatan, for the coarse fibres of its developed leaves, called Sosquil, or Sisal hemp; and as the Istle, which is propagated in the shady forests of Goazacoalcos, for the fine fibres of its long leaves, called Pita, or tropical flax!

The subscriber has long furnished sufficient facts and arguments to satisfy practical men, that the Istle does not belong even to the same genus; and that the Maguey de pulque, and the Henequen de sosquil are, at least, very different species from the Agave Americana; but as botanical parrots still repeat that the Agave sisalana of the subscriber is a mere variety of the Agave Americana of the books, he has great satisfaction in announcing to the department that, by the flowering of a plant of the Yashquí, a kind of Henequen, in its fifteenth year, he has acquired the power of demonstrating, botanically, not merely that it is an entirely different species, but that its fructification affords characters which may be sufficient to form an entirely

new genus. Either as a new genus, as a new species, or as both, it will perpetuate the name of any personage who may effectually promote its domestication in the United States, with much more meritorious associations than those which accompany the name of Bonapartea juncea, applied to a useless plant of the same noble natural family of Bromeliaceæ. As the species called Agave Americana, is characterized by the spiny toothed edge of its leaves, the absence of thorns on the edge of the leaves of the Yashquí, is a specific difference, sufficient to distinguish one plant from the other in all periods of their existence. But as botanists have also aggregated specific characters, taken from the parts of fructification, although, by their own rules, these should furnish generic characters alone, the subscriber is obliged to follow them, to show that neither the generic nor specific characters of the flowers and fruits of this Agave are found in those of the Yashquí henequen. Suffice it to say, that, of this species of henequen, the corrolla is bell-form; its segments converging, and longer than the tube; the very long filaments are awl-shape, and inserted into the base of the segments, or near the top of the tube. The style is not half as long as the stamens, and is even very little elevated above the segments of the corrolla, when its three-lobed stigma receives the pollen from the bursting anthers; the corrolla, stamen, and style, continue all permanent on the germ, and the germ itself becomes a cylindrical capsula, which, opening at the top in three divisions, even splits the dried tube of the corrolla, still obstinately adhering with its withered segment filaments and style. Details of the mode of flowering, of the relative position of the abundant flowers, of the peduncles and pedicels, of the subdivided branches and branchlets, and of the stately stalk which sustains all, are not necessary for the objects of the present communication. Even the bombastic baron has admitted, in his essay on New Spain, that "in the Spanish colonies there are several species of Maguey which deserve a careful examination; of which several, on account of the divisions of their corrolla, the length of their stamina, and the form of their stigma, appear to belong to a different genus;" and he has, moreover, confessed that "the plant cultivated for distillation, differs essentially from the common Maguey de pulque," being smaller, and the leaves not so glaucous, "but not having seen it in flower, I cannot pretend to judge of the difference of the two species." Yet the same dogmatic German, in the same pages, has unhesitatingly asserted that "the Magueys or metl, cultivated in Mexico, are numerous varieties of the Agave Americana, which has become so common in our gardens, with yellow fasciculated and straight leaves, and stamina twice as long as the pinking of the corrolla." Having thus made the own pen of Humboldt convict him of gross misrepresentations concerning the Agaves, and having established the important specific differences, if not the entire generic independence, of the very fibrous-leaved Henequen, the subscriber begs the department to reflect attentively on the single fact, that the very strong, light, elastic, durable, foliaceous fibres of the Yashquí, extracted from the fresh leaves by simple scraping only, are immediately converted into cheap cloth for bagging, &c., without spinning, twisting, or any intermediate preparation, or any fabrication whatever! By the quadruple properties united in the single, untwisted, foliaceous fibres of Henequen, they become a superior substitute for the compound, twisted, cortical fibres of hemp, in the manufacture of many coarse articles of extensive consumption, hitherto woven of spun thread; and will furnish cheaper equivalents for baling, and envelopes in general, than any other

kind of extracted fibres, or any other material which can be woven, netted, matted, or plaited; excepting dried, undressed fibrous leaves! Indeed, they are here used instead of hair, for the construction of sieves; instead of withes for baskets; instead of leather and wood, for valises and trunks; and even as curious substitutes for glass and clay, in the shape of bottles, and bowls, and cups and saucers; and hence it may be confidently anticipated that, in the United States they will, ere long, be converted into innumerable forms of ornament and utility, which, combining the advantages of cheapness, strength, lightness, elasticity, and durability, will become superior substitutes for similar articles of manufacture at present made from many different materials. The subscriber respectfully reminds the department, that, although the Yashquí species of Henequen yields the best quality of foliaceous fibres, the Sacquí yields the greatest quantity; and that, although these are the most celebrated species in cultivation, there are several other species, wild in the woods and plains of Yucatan, which merit to be transported also to Cape Florida. He, therefore, further suggests that great pains should be taken in selecting the very best individuals of the very best varieties of each species, on account of either the quality or quantity of their fibres, or the soils or situations which they especially prefer, although they grow well in all.

Ten thousand of superior individuals of the superior varieties of the cultivated species of Sacquí and of Yashqui, and one hundred each of the peculiar varieties of the wild species of Chelem, Cahum, Chulul-qui, &c., would form a more valuable cargo than has ever yet been transported to the United States, even admitting that the fibres should never be devoted to any other use than to the manufacture of paper alone. By a letter of the 5th instant, from the Senr. Don Jose M. Peon, a legitimate representative to Congress from this State, remaining in Mexico, the subscriber is reassured that a manufactory of the paper of Maguey exists in the village of San Angel, three leagues from the capital; and that in consequence of it, another paper mill is about to be established in the city of Puebla. The collector of this port, who brought with him a ream of Maguey paper from the city of Mexico, states that by special decree of Congress, this paper, made of foliaceous fibres, is ordered to be used for the record of laws, and all official transactions of the members of Government. As, however, the best species of Maguey are very inferior to the worst species of Henequen, both in the quality and quantity of their foliaceous fibres, how much cheaper and better will be the paper of Henequen! And as the manufacture of Maguey paper is especially encouraged by the Government of a country in which ninety-nine out of every hundred adults cannot even spell their names, how much more greatly should the manufacture of Henequen paper be promoted by the Government of a country where ninety-nine out of every hundred children can both read and write. As the unextracted foliaceous fibres of Henequen may be profitably produced, at half a cent per pound, and as the succulent parenchyma which envelopes them, will even aid their conversion into paper, it may be manufactured from the fresh, fleshy fibrous leaves, at so small a price, that Henequen paper may become as important an auxiliary to the progress of popular education as the printing press itself! Contemplating, then, the importance of the unextracted fibres of the Henequen for cheap paper; of the untwisted fibres for cheap peculiar manufactures, and of the twisted fibres for cheap cordage and canvass, the subscriber repeats, in the language of one section of his

memorial to Congress, on the 6th of February, 1832, "That in the opinion of your memorialist, the domestication of the species of a single genus of tropical plants, will cause a great revolution in the agriculture of the southern States, which will not only effectually relieve their present embarrassments, but will also give a productive value to their ruined fields and most sterile districts; and that the extensive cultivation of a single species, the Agave sisalana alone, will furnish a profitable staple to the planters of the south, and a cheap material to the manufacturers of the north, which will supply many wants of our merchants' vessels, our navy, and our citizens in general; augment our coasting trade, and our foreign commerce, and thus contribute greatly to the prosperity and perpetuity of the Union." As the precited Hon. J. M. Peon has forwarded to the subscriber a selected specimen of the best fibres of the Maguey of upland Mexico, the subscriber now transmits it, with an unselected sample of the ordinary fibres of the Henequen of lowland Yucatan, for the attentive comparison of the department; adverting that the Maguey fibres are extracted from leaves previously roasted under ground by tedious and troublesome operations; while the Henequen fibres are obtained from fresh leaves by simple scraping only; and to demonstrate the facility of the latter process, with the abundance of the foliaceous fibres, he will also send some fresh leaves of Yashquí and Sacquí, each having two-thirds of their length thus freed from the pulpy parenchyma, although the unscraped succulent extremities will doubtless mould on their way to Washington. The subscriber now entertains the respectful hope that the arguments and facts presented by his numerous communications in favor of the propagation of the fibrous-leaved henequens in particular, and of fibrous-leaved plants in general, throughout the poorest districts of Florida and our southern States, will be considered sufficiently important to merit that both the Executive and Legislative Departments of Government should immediately extend effective encouragement to the production of foliaceous fibres in the United States. As the last compromising tariff has even cut off the incidental encouragement which a revenue duty would afford to the cultivation of exotic plants, the subscriber cannot doubt that the Executive Department alone will now effectually promote the objects of the unrevoked Treasury circular of the 6th September, 1827, so far, at least, as to instruct our naval vessels to carry hereafter, direct to tropical Florida, all such tropical plants as have heretofore perished in the extra tropical ports to which they were conveyed. As the services and suggestions of the subscriber, in behalf of the domestication of tropical plants, should entitle him to small favor, though great distinction, of a special act of sale of thirty-six sections of land in tropical Florida, to ensure merely the right and safety of location for himself and associates, in the propagation of productive plants, he is respectfully disposed to believe that even the Department of State itself may promote the modification and passage of bill 555, of 26th of April, 1832, during the actual short session of Congress. As Dr. Ramon de la Sagra, professor of the botanical garden, and director of the pattern plantation, near Havana, continues to promise all the useful plants under his care, to promote the "utilisimo proyecto" of the subscriber, an acclimating nursery in tropical Florida may be immediately established, with all the fruits of many years, much money, and more trouble destined by royal bounty to fill the acclimating nurseries of Spain alone. As E. Rosseau, Esq., secretary of the Agricultural Society of New Orleans, has written to the subscriber that his various "lengthy and most interest-

ing communications," with the printed documents annexed, have received an "attentive perusal," and were referred to a special committee, to repeat the subject at the next meeting; and that "the board appears very favorably inclined towards meeting his views," it may be inferred that this patriotic association will also aid the establishment of an acclimating nursery, in which tropical plants may profitably rest on their route to Louisiana.

As the extraction, transportation, and transplantation of living plants are most easily and successfully effected during the months immediately preceding the wet season; as the immense geometrical progression of vegetable reproduction in tropical climates, renders a single year of incalculable importance in the growth of a distributing nursery; and as the health of the subscriber is gradually improving with the progress of the dry season, and of reviving hope, he is disposed to devote all his remaining funds towards the extraction of all the valuable vegetables, both native and exotic, of tropical Mexico and Cuba, &c., to their transplantation in tropical Florida; and, therefore, if, by the 4th of March next, Congress shall merely determine to grant him a safe title to a single section of land, and the Navy Department shall decide to loan him a safe conveyance of a single cargo of plants, the ensuing summer will witness the growing foundation of the most important establishment ever projected by a humble citizen of the United States, to promote the agricultural prosperity of his country. The successful progress of an individual collection of tropical plants, will probably excite the speedy formation of a great national acclimating nursery, through which may be domesticated in the United States of America, not only the united vegetables of America, but, also, all the productive plants of the world; and, having always afforded a generous asylum to the oppressed natives of all nations, we shall then furnish to the individuals of each, the heartfelt gratification experienced by the Otaheitean at the sight of a banana plant in the gardens of Paris, who rushed forward to embrace it, with tears in his eyes, exclaiming, "tree of my country!"

HENRY PERRINE.

To the Senate and House of Representatives of the United States of America in Congress assembled:

The memorial of Henry Perrine, Doctor of Medicine, &c., and late American Consul at Campeachy, in Yucatan,

RESPECTFULLY SHOWETH:

1. That, on the 6th day of February, 1832, your memorialist, respectfully directed, from the city of New York, to your honorable assembly, a memorial in favor of the immediate domestication of tropical plants in southern Florida, which resulted in the printed pamphlets of the 1st session of the 22d Congress, headed Doc. 198, Rep. No. 454, and H. R. 555, a bill to encourage the introduction and promote the cultivation of tropical plants in the United States.

2. The said bill, conveying to your memorialist and his associates a township of land, on the condition that every section should be forfeited if at least one-fourth thereof should not be occupied and *successfully cult*

vated in tropical and other exotic plants, *within five years*, was reported on the 26th day of April, 1832, "read twice, and committed to a Committee of the Whole House to-morrow;" that, as that period had not arrived on the 29th December, 1834, your memorialist respectfully directed from the city of Campeachy a supplementary memorial, to solicit that said bill might become a law, with such modifications as the wisdom and justice of that Congress should suggest; and that, as said supplementary memorial was not, apparently, ever presented, your memorialist has come to this city of Washington, with the hope of attracting the attention of Congress to the most important enterprise ever proposed by a humble citizen of the United States to promote the prosperity of his country.

3. That, to avoid all unnecessary occupation of the time or attention of either House during the present short session of Congress, your memorialist most respectfully solicits that his petition may be referred to the Committee on Agriculture, before whom he can appear with specimens of tropical plants, accompanied with documents and details to prove the merits of his claims, and the importance of his enterprise to the peace, population, prosperity, and permanency of the Union.

And your memorialist, &c.

HENRY PERRINE.

WASHINGTON, D. C., *September* 8, 1837.

Extract of a letter to General Jesup from the Secretary of War, dated July 25, 1837.

"It is true that the Seminoles dwell in an inhospitable and deadly climate, and occupy inaccessible swamps and morasses, which are not susceptible of cultivation or improvement by the whites."—*Globe, March* 16, 1838.

Extract of a letter from General Jesup to the Secretary of War, dated Fort Jupiter, February 11, 1838.

"My decided opinion is that, unless *immediate* emigration be abandoned, the war will continue for years to come, and at constantly accumulating expense. Is it not, then, well worthy the serious consideration of an enlightened Government, whether, even if the wilderness we are traversing could be inhabited by the white man, (which is not the fact,) the object we are contending for would be worth the cost? I certainly do not think it would; indeed, I do not consider the country south of Chickasa-hatch worth the medicines we shall expend in driving the Indians from it."—*Globe, March* 16, 1838.

DOCUMENT No. 3.

METEOROLOGICAL TABLES

OF

INDIAN KEY AND SANTA CRUZ, IN DETAIL;

OF

HAVANA, KEY WEST, NEW ORLEANS, AND ALBANY,

The comparative results, or mean monthly and annual temperature, and fall of rain.

A METEOROLOGICAL REGISTER, kept at Indian Key, from 1st of February, 1837, to 31st of February, 1838.

Date.	Themometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, Febuary 1	70	72	30.16	30.12	East -	Light -	East -	Light -	Cloudy and rain.
2	69	72	30.10	30.10	Northeast -	Light -	East -	Light -	Cloudy and rain.
3	68	70	30.06	30.08	East -	Fresh -	East -	Fresh -	Cloudy.
4	70	72	30.12	30.10	Southeast -	Very fresh -	Southeast -	Very fresh -	Fair.
5	72	76	30.08	30.00	Southwest -	Brisk -	West -	Pleasant -	Fair.
6	70	78	30.14	30.06	North -	Brisk -	East -	Pleasant -	Fair.
7	72	78	30.20	30.10	East -	Pleasant -	East -	Pleasant -	Fair.
8	73	78	30.10	30.12	East -	Light -	Southwest -	Pleasant -	Fair.
9	68	66	30.18	30.23	W. northwest	Fresh -	W. northwest	Very fresh -	Fair.
10	60	66	30.32	30.20	North -	Fresh -	East -	Fresh -	Fair.
11	68	75	30.25	30.22	East -	Brisk -	East -	Brisk -	Fair.
12	74	76	30.16	30.28	Southeast -	Pleasant -	West -	Fresh -	Cloudy and rain.
13	61	69	30.50	30.40	North -	Fresh -	Northeast -	Fresh -	Fair.
14	68	73	30.40	30.30	East -	Very fresh -	East -	Very fresh -	Cloudy.
15	73	74	30.18	30.10	East -	Very fresh -	Southeast -	Very fresh -	Fair.
16	74	76	30.00	30.16	Southeast -	Fresh -	Southwest -	Fresh -	Fair.
17	66	60	30.22	30.48	Northwest -	Very fresh -	Northwest -	Very fresh -	Cloudy.
18	51	56	30.59	30.50	North -	Fresh -	North -	Fresh -	Fair.
19	51	61	30.64	30.40	North -	Fresh -	East -	Fresh -	Fair.
20	66	74	30.32	30.20	Southeast -	Fresh -	Southeast -	Fresh -	Fair.
21	69	74	30.22	30.20	Southeast -	Pleasant -	Northeast -	Brisk -	Fair.
22	71	78	30.18	30.08	East -	Pleasant -	Southeast -	Pleasant -	Fair.
23	73	78	30.06	30.00	South -	Pleasant -	South -	Light -	Fair.
24	74	79	30.06	30.16	South -	Calm -	West -	Pleasant -	Fair.
25	71	76	30.20	30.10	North -	Light -	Northwest -	Pleasant -	Fair.
26	73	78	30.16	30.10	North -	Pleasant -	Southeast -	Light -	Fair.
27	73	80	30.12	29.90	South -	Brisk -	Southwest -	Fresh -	Fair.
28	62	65	30.30	30.38	North -	Fresh -	North -	Brisk -	Fair.

1.10 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, March 1	59	69	30.48	30.32	North -	Fresh -	East -	Fresh -	Fair.
2	68	74	30.28	30.16	East -	Fresh -	East -	Brisk -	Fair.
3	71	76	30.06	30.08	Southeast -	Light -	South -	Pleasant -	Fair.
4	71	72	30.12	30.16	West -	Fresh -	West -	Fresh -	Fair.
5	62	69	30.40	30.40	North -	Fresh -	Northeast -	Fresh -	Fair.
6	67	71	30.46	30.36	Northeast -	Fresh -	East -	Very fresh	Cloudy.
7	70	74	30.30	30.20	East -	Very fresh	East -	Very fresh	Cloudy.
8	72	75	30.14	30.08	Southeast -	Very fresh	Southeast -	Fresh -	Cloudy.
9	73	75	30.08	30.04	Southeast -	Fresh -	Variable -	Light -	Fair.
10	70	78	30.14	30.00	Northwest	Light -	Variable -	Light -	Fair.
11	69	73	30.20	30.20	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
12	69	74	30.18	30.12	East -	Fresh -	East -	Fresh -	Fair.
13	72	79	30.06	30.04	Southeast -	Fresh -	Southeast -	Pleasant -	Fair.
14	75	81	30.08	30.00	South -	Pleasant -	South -	Light -	Fair.
15	76	78	30.15	30.12	West -	Brisk -	Northwest	Brisk -	Fair.
16	64	66	30.34	30.30	North -	Fresh -	North -	Fresh -	Fair.
17	62	70	30.44	30.26	North -	Fresh -	East -	Very fresh	Fair.
18	68	74	30.34	30.28	East -	Fresh -	East -	Pleasant -	Fair.
19	70	78	30.20	30.06	Northwest	Pleasant -	Northwest	Pleasant -	Clear and pleasant.
20	70	78	30.20	30.00	North -	Brisk -	East -	Pleasant -	Fair.
21	72	80	30.10	30.02	East -	Pleasant -	East -	Pleasant -	Fair.
22	74	82	30.04	30.02	Southeast -	Pleasant -	South -	Light -	Clear and pleasant.
23	72	80	30.10	30.00	North -	Pleasant -	East -	Brisk -	Fair.
24	72	78	30.06	30.06	East -	Fresh -	East -	Brisk -	Fair.
25	68	76	30.20	30.00	North -	Fresh -	East -	Light -	Fair.
26	73	74	30.04	30.00	South -	Fresh -	Southeast -	Brisk -	Cloudy.
27	70	78	30.02	30.00	Northeast -	Light -	East -	Brisk -	Cloudy and rain.
28	67	78	30.08	30.06	North -	Brisk -	Northeast -	Pleasant -	Fair.
29	67	76	30.05	30.01	North -	Brisk -	East -	Light -	Fair.
30	70	78	30.14	29.98	North -	Light -	East -	Calm -	Fair.
31	73	81	30.02	29.90	Southeast -	Brisk -	South -	Brisk -	Fair.

0.09 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date		Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
		Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, April	1	76	78	29.92	29.86	South -	Light -	West -	Fresh -	Fair.
	2	69	78	30.10	29.88	North -	Fresh -	East -	Brisk -	Fair.
	3	72	80	29.90	29.86	East -	Brisk -	East -	Brisk -	Fair.
	4	76	80	29.88	29.80	East -	Brisk -	South -	Brisk -	Fair.
	5	77	84	29.78	29.68	South -	Fresh -	South -	Brisk -	Fair.
	6	79	86	29.78	29.75	South -	Pleasant -	South -	Pleasant -	Fair.
	7	77	84	29.84	29.80	South -	Brisk -	Southwest	Pleasant -	Fair
	8	72	70	30.00	30.04	Northwest	Fresh -	Northwest	Fresh -	Fair.
	9	66	70	30.28	30.18	North -	Brisk -	Northwest	Pleasant -	Fair.
	10	65	73	30.24	30.06	North -	Fresh -	North -	Light -	Fair.
	11	73	78	30.14	30.16	East -	Brisk -	East -	Brisk -	Fair.
	12	73	80	30.12	29.96	East -	Pleasant -	East -	Pleasant -	Fair.
	13	75	83	29.94	29.84	Southeast -	Pleasant -	South -	Light -	Fair.
	14	75	83	29.90	29.82	Southeast -	Pleasant -	South -	Light -	Fair.
	15	78	85	29.78	29.68	South -	Brisk -	South -	Brisk -	Fair.
	16	78	80	29.78	29.88	West -	Brisk -	West -	Brisk -	Cloudy and rain.
	17	73	82	30.04	29.88	North -	Brisk -	Southeast -	Calm -	Fair.
	18	72	80	30.16	30.10	North -	Brisk -	East -	Pleasant -	Fair.
	19	74	80	30.16	30.12	East -	Fresh -	East -	Brisk -	Fair.
	20	75	82	30.14	30.06	East -	Brisk -	East -	Brisk -	Fair.
	21	76	84	30.08	30.00	Southeast -	Fresh -	South -	Light -	Fair.
	22	76	84	30.02	29.96	South -	Light -	South -	Light -	Fair.
	23	77	86	30.00	29.94	South -	Calm -	South -	Light -	Fair.
	24	79	86	29.92	29.94	Southwest	Light -	West -	Light -	Fair.
	25	79	84	29.84	29.80	West -	Brisk -	West -	Brisk -	Fair.
	26	79	82	29.80	29.82	West -	Light -	Northwest	Brisk -	Fair.
	27	72	76	30.10	30.02	North -	Brisk -	Northeast -	Fresh -	Fair.
	28	70	72	30.22	30.18	Northeast -	Very fresh	Northeast -	Very fresh	Cloudy and rain.
	29	66	73	30.18	30.22	Northeast -	Fresh -	North -	Fresh -	Cloudy and rain.
	30	65	70	30.22	30.20	North -	Fresh -	Northeast -	Brisk -	Cloudy.

2.00 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.		Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
		Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, May	1	73	77	30.10	30.08	Northeast -	Brisk -	Northeast -	Brisk -	Fair.
	2	71	80	30.12	30.06	Northeast -	Brisk -	Northeast -	Pleasant -	Fair.
	3	76	80	30.07	30.00	E. northeast	Brisk -	East -	Pleasant -	Fair.
	4	78	84	30.02	29.94	East -	Pleasant -	East -	Fresh -	Fair.
	5	79	84	30.04	29.92	East -	Pleasant -	East -	Pleasant -	Fair.
	6	79	86	30.00	29.84	East -	Pleasant -	East -	Light -	Clear and pleasant.
	7	79	87	30.00	29.86	East -	Light -	East -	Calm -	Fair.
	8	80	87	29.96	29.82	Southeast -	Calm -	Variable -	Light -	Fair.
	9	79	82	30.00	29.94	Northeast -	Brisk -	Variable -	Brisk -	Cloudy
	10	77	84	29.94	29.84	East -	Brisk -	East -	Pleasant -	Fair.
	11	78	85	29.90	29.76	East -	Pleasant -	East -	Pleasant -	Fair.
	12	80	86	29.84	29.78	East -	Brisk -	East -	Pleasant -	Fair.
	13	79	83	29.84	29.76	Southeast -	Brisk -	Southeast -	Brisk -	Cloudy.
	14	77	85	29.82	29.64	East -	Pleasant -	Southwest	Brisk -	Fair.
	15	78	83	29.68	29.56	Southwest -	Brisk -	West -	Fresh -	Cloudy and rain.
	16	72	79	29.92	29.84	North -	Fresh -	North -	Fresh -	Fair.
	17	72	81	30.04	29.90	North -	Brisk -	East -	Pleasant -	Fair.
	18	78	84	30.00	29.76	Southeast -	Brisk -	South -	Pleasant -	Fair.
	19	78	88	29.86	29.70	South -	Light -	South -	Light -	Fair.
	20	80	84	29.96	29.85	Northeast -	Brisk -	East -	Brisk -	Fair.
	21	81	81	30.00	29.94	East -	Fresh -	East -	Fresh -	Cloudy.
	22	77	83	29.98	29.90	East -	Fresh -	East -	Fresh -	Fair.
	23	79	83	29.94	29.88	East -	Fresh -	East -	Fresh -	Fair.
	24	80	83	29.94	29.90	East -	Fresh -	East -	Very fresh	Squally and rain.
	25	81	86	29.88	29.74	Southeast -	Fresh -	South -	Brisk -	Fair.
	26	81	84	29.82	29.80	South -	Light -	South -	Light -	Cloudy part day.
	27	80	88	29.81	29.76	South -	Light -	South -	Light -	Fair.
	28	81	84	29.92	29.82	Southeast -	Light -	East -	Fresh -	Fair.
	29	80	84	29.94	29.80	East -	Pleasant -	East -	Pleasant -	Fair.
	30	78	84	29.92	29.78	East -	Fresh -	East -	Fresh -	Squally and rain.
	31	76	80	29.84	29.76	East -	Fresh -	East -	Fresh -	Fair.
										0.09 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.		Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
		Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837. June	1	76	82	29.84	29.80	East -	Brisk -	East -	Fresh -	Fair.
	2	76	84	30.00	30.00	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
	3	78	84	30.00	29.90	North -	Pleasant -	East -	Brisk -	Fair.
	4	80	87	29.94	29.86	East -	Calm -	South -	Calm -	Fair.
	5	81	88	29.92	29.86	South -	Calm -	South -	Calm -	Fair.
	6	82	88	29.90	29.72	North -	Calm -	Southwest	Calm -	Fair.
	7	84	88	29.78	29.70	Southwest	Light -	West -	Pleasant -	Fair.
	8	83	88	29.72	29.62	West -	Pleasant -	West -	Fresh -	Fair.
	9	82	87	29.72	29.62	Northwest	Fresh -	West -	Fresh -	Fair.
	10	82	87	29.71	29.58	North -	Fresh -	Northwest	Brisk -	Fair.
	11	77	86	29.82	29.67	North -	Fresh -	East -	Light -	Fair.
	12	80	88	29.76	29.62	East -	Calm -	South -	Light -	Fair.
	13	82	89	29.74	29.64	Southeast -	Light -	South -	Light -	Fair.
	14	82	87	29.74	29.64	South -	Light -	Southwest-	Brisk -	Fair.
	15	83	87	29.78	29.70	Southwest	Brisk -	Southwest-	Brisk -	Fair.
	16	82	86	29.84	29.78	Southwest	Fresh -	Southwest-	Fresh -	Fair.
	17	82	88	29.88	29.74	Southwest	Light -	Southwest-	Brisk -	Fair.
	18	82	87	29.80	29.80	West -	Brisk -	Southwest-	Brisk -	Fair.
	19	83	89	29.84	29.74	Southwest	Brisk -	South -	Calm -	Fair.
	20	83	89	29.86	29.70	Southwest	Light -	Southwest-	Calm -	Clear and pleasant.
	21	84	90	29.80	29.70	Southwest	Calm -	Southwest-	Calm -	Clear and pleasant.
	22	84	88	29 90	29.86	Northwest	Light -	East -	Pleasant -	Clear and pleasant.
	23	84	86	29.94	29.90	East -	Brisk -	East -	Brisk -	Fair.
	24	84	87	29 94	29.84	East -	Fresh -	East -	Fresh -	Fair.
	25	83	87	29.92	29.86	East -	Fresh -	Southeast -	Fresh -	Cloudy.
	26	82	86	29.98	29.84	East -	Fresh -	Southeast -	Fresh -	Cloudy.
	27	84	86	29.92	29.88	Southeast -	Fresh -	Southeast -	Fresh -	Fair.
	28	82	86	29.94	29.90	East -	Fresh -	East -	Fresh -	Fair.
	29	82	87	29.92	29.86	East -	Fresh -	East -	Fresh -	Squally.
	30	83	87	29 88	29.84	East -	Fresh -	East -	Fresh -	Fair.

3.10 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.		Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
		Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, July	1	82	86	29.92	29.90	East -	Fresh -	East -	Fresh -	Fair.
	2	83	87	29.94	29.84	East -	Brisk -	East -	Brisk -	Fair.
	3	83	87	29.96	29.80	East -	Brisk -	East -	Brisk -	Fair.
	4	84	90	29.84	29.76	Southeast -	Calm -	South -	Light -	Clear and pleasant.
	5	83	90	29.92	29.74	South -	Calm -	Southeast -	Light -	Fair.
	6	83	90	29.96	29.88	Southeast -	Light -	Southeast -	Calm -	Fair.
	7	83	89	29.94	29.80	Southeast -	Calm -	Southeast -	Pleasant -	Fair.
	8	84	88	29.90	29.86	Southeast -	Brisk -	Southeast -	Brisk -	Fair.
	9	82	86	30.04	29.90	South -	Light -	East -	Brisk -	Cloudy and squally.
	10	82	87	30.04	29.90	East -	Brisk -	Southeast -	Light -	Fair.
	11	83	88	29.94	29.88	East -	Calm -	East -	Calm -	Fair.
	12	84	89	29.92	29.70	East -	Calm -	East -	Light -	Fair.
	13	83	88	29.82	29.80	South -	Calm -	West -	Fresh -	Severe squall, 3 P. M.
	14	83	88	29.84	29.72	North -	Light -	West -	Pleasant -	Fair.
	15	83	89	29.90	29.80	West -	Pleasant -	West -	Brisk -	Fair.
	16	79	86	30.00	29.94	South -	Light -	Southeast -	Brisk -	Cloudy and rain.
	17	80	84	30.02	29.98	Southeast -	Fresh -	East -	Brisk -	Cloudy and rain.
	18	83	85	29.94	29.92	East -	Fresh -	Northeast -	Fresh -	Fair.
	19	83	86	29.90	29.90	East -	Fresh -	East -	Brisk -	Fair.
	20	83	87	29.94	29.92	East -	Light -	East -	Pleasant -	Fair.
	21	83	87	29.96	29.90	Southeast -	Light -	East -	Pleasant -	Fair.
	22	83	88	29.88	29.88	Southeast -	Light -	Southeast -	Brisk -	Fair.
	23	84	89	29.93	29.80	Southeast -	Calm -	Southeast -	Pleasant -	Fair.
	24	84	90	29.96	29.78	Southeast -	Calm -	South -	Calm -	Fair.
	25	85	90	29.88	29.80	Southwest	Light -	West -	Fresh -	Fair.
	26	84	90	29.86	29.78	East -	Calm -	East -	Light -	Fair.
	27	84	89	29.86	29.76	East -	Calm -	South -	Calm -	Fair.
	28	85	87	29.76	29.78	Southeast -	Brisk -	East -	Fresh -	Cloudy.
	29	86	86	29.76	29.75	East -	Fresh -	East -	Very fresh	Fair.
	30	84	86	29.78	29.72	East -	Brisk -	East -	Fresh -	Cloudy part day.
	31	82	85	29.71	29.64	North -	Very fresh	Northwest	Very fresh	Cloudy.

3.70 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, August 1	82	78	29.72	29.84	West -	Very fresh	West -	Very fresh	Severe sq'alls, with rain, thunder, &c.
2	80	83	29.88	29.94	Southwest	Very fresh	West -	Brisk -	Squally.
3	81	86	29.96	29.88	South -	Pleasant -	South -	Light -	Fair.
4	83	88	29.90	29.80	Calm -	Calm -	Calm -	Calm -	Fair.
5	84	86	29.79	29.82	North -	Pleasant -	West -	Fresh -	Fair.
6	84	86	29.78	29.84	South -	Fresh -	Southwest	Fresh -	Cloudy.
7	82	86	29.96	29.94	South -	Fresh -	Southeast -	Fresh -	Cloudy and rain.
8	82	86	30.00	30.00	Southeast -	Fresh -	Southeast -	Fresh -	Clear and pleasant.
9	82	86	30.04	29.94	Southeast -	Fresh -	Southeast -	Fresh -	Fair.
10	83	86	29.98	29.84	East -	Brisk -	East -	Brisk -	Fair.
11	83	86	29.92	29.90	East -	Brisk -	East -	Brisk -	Fair.
12	83	86	29.96	29.92	East -	Fresh -	East -	Brisk -	Fair.
13	83	86	30.02	29.90	East -	Fresh -	East -	Brisk -	Fair.
14	83	86	29.94	29.92	East -	Brisk -	East -	Brisk -	Fair.
15	83	86	29.86	29.80	East -	Fresh -	East -	Brisk -	Fair.
16	83	86	29.80	29.78	Northeast -	Pleasant -	Northeast -	Brisk -	Fair.
17	84	87	29.74	29.61	West -	Fresh -	Northwest	Fresh -	Fair.
18	84	88	29.76	29.75	West -	Pleasant -	West -	Brisk -	Fair.
19	85	87	29.84	29.76	West -	Light -	West -	Pleasant -	Fair.
20	85	87	29.88	29.80	West -	Light -	West -	Pleasant -	Fair.
21	84	90	29.88	29.64	West -	Light -	West -	Pleasant -	Fair.
22	85	89	29.88	29.66	North -	Light -	West -	Light -	Fair.
23	84	89	29.86	29.70	West -	Light -	West -	Calm -	Fair.
24	84	88	29.86	29.88	South -	Pleasant -	Southeast -	Pleasant -	Fair.
25	84	88	29.84	29.82	Southeast -	Pleasant -	Southeast -	Pleasant -	Fair.
26	83	88	29.88	29.74	Southeast -	Brisk -	East -	Brisk -	Fair.
27	82	86	29.78	29.80	East -	Fresh -	East -	Fresh -	Fair.
28	82	86	29.86	29.76	East -	Fresh -	East -	Fresh -	Fair.
29	80	82	29.88	29.89	East -	Very fresh	East -	Very fresh	Cloudy and rain.
30	82	84	29.90	29.90	East -	Fresh -	East -	Very fresh	Cloudy and rain.
31	82	86	29.92	29.82	East -	Fresh -	South -	Light -	Cloudy.

6.75 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity	Course.	Velocity.	
1837, September 1	83	84	29.90	29.80	West -	Fresh -	Southwest	Brisk -	Cloudy and rain.
2	82	85	29.92	29.92	West -	Light -	South -	Light -	Cloudy.
3	83	85	29.88	29.90	East -	Light -	East -	Brisk -	Fair.
4	84	85	30.00	30.00	East -	Brisk -	East -	Fresh -	Fair.
5	83	86	30.04	30.00	East -	Fresh -	East -	Fresh -	Fair.
6	84	85	30.02	29.98	East -	Fresh -	East -	Fresh -	Fair.
7	83	86	29.96	29.98	East -	Fresh -	East -	Fresh -	Fair.
8	82	87	29.90	29.90	East -	Brisk -	East -	Brisk -	Fair.
9	82	87	29.84	29.86	Southeast -	Light -	Southeast -	Brisk -	Fair.
10	82	85	29.88	29.84	Southeast -	Light -	Southeast -	Fresh -	Fair.
11	80	81	29.82	29.60	South -	Fresh -	South -	Very fresh	Violent storm from noon until
12	79	85	29.70	29.58	West -	Fresh -	West -	Fresh -	Cloudy. [10, night.
13	79	84	29.70	29.65	Northwest	Brisk -	West -	Pleasant -	Fair.
14	80	85	29.83	29.78	North -	Pleasant -	North -	Pleasant -	Clear and pleasant.
15	81	87	29.68	29.70	South -	Light -	South -	Light -	Pleasant.
16	83	87	29.80	29.72	Southeast -	Pleasant -	Southeast -	Pleasant -	Fair.
17	84	86	29.92	29.86	East -	Brisk -	East -	Pleasant -	Fair.
18	82	88	29.96	29.86	Southeast -	Brisk -	Southeast -	Pleasant -	Fair.
19	83	86	29.94	29.90	Southeast -	Brisk -	East -	Brisk -	Fair.
20	82	87	29.94	29.84	East -	Pleasant -	East -	Pleasant -	Fair.
21	83	87	29.92	29.90	East -	Pleasant -	East -	Fresh -	Fair.
22	82	87	29.94	29.92	East -	Fresh -	East -	Pleasant -	Fair.
23	82	87	30.00	29.88	East -	Brisk -	North -	Light -	Clear and pleasant.
24	81	86	30.00	29.86	East -	Light -	East -	Brisk -	Fair.
25	80	82	29.90	29.92	East -	Fresh -	East -	Very fresh	Cloudy, heavy squalls, wind
26	80	83	29.92	29.84	East -	Fresh -	East -	Fresh -	Cloudy. [and rain.
27	81	84	29.92	29.90	East -	Fresh -	East -	Fresh -	Fair.
28	81	84	29.94	29.90	East -	Fresh -	East -	Fresh -	Fair.
29	82	84	29.94	29.94	East -	Fresh -	East -	Fresh -	Fair.
30	82	85	29.98	29.94	East -	Fresh -	East -	Fresh -	Fair.

7.25 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, October 1	82	85	30.02	29.96	East -	Fresh -	East -	Brisk -	Clear and pleasant.
2	82	86	30.04	30.02	East -	Brisk -	East -	Pleasant -	Fair.
3	81	86	30.06	29 94	Southeast -	Pleasant -	East -	Pleasant -	Fair.
4	83	86	29.98	29.96	Southeast -	Pleasant -	East -	Pleasant -	Fair.
5	83	87	30.00	29.88	Southeast -	Pleasant -	Southeast -	Pleasant -	Fair.
6	82	88	29.96	29.84	Southeast -	Light -	Southeast -	Calm -	Fair.
7	83	88	29.90	29.78	South -	Pleasant -	Southeast -	Pleasant -	Fair.
8	84	87	29.85	29.82	South -	Brisk -	West -	Brisk -	Fair.
9	80	86	29.98	29.86	West -	Light -	West -	Light -	Cloudy and rain.
10	77	82	30.08	30.00	North -	Brisk -	Northeast -	Brisk -	Fair.
11	78	84	30.10	30.06	North -	Light -	East -	Pleasant -	Fair.
12	81	85	30.08	30.04	East -	Brisk -	East -	Pleasant -	Fair.
13	81	84	30.10	30.08	East -	Light -	East -	Pleasant -	Fair.
14	80	86	30.10	30.10	North -	Brisk -	East -	Pleasant -	Fair.
15	81	84	30.10	30.09	East -	Brisk -	Northeast -	Fresh -	Fair.
16	80	84	30.16	30.10	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
17	79	82	30.12	30.06	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
18	77	79	30.06	29.92	North -	Fresh -	North -	Fresh -	Cloudy.
19	76	80	29.96	29.88	North -	Fresh -	North -	Fresh -	Cloudy and rain.
20	76	82	30.00	29.96	Southeast -	Brisk -	East -	Brisk -	Fair.
21	79	84	30.06	30.04	East -	Pleasant -	East -	Pleasant -	Fair.
22	80	84	30.10	30.02	East -	Pleasant -	East -	Brisk -	Fair.
23	79	82	30.04	29.98	East -	Fresh -	East -	Fresh -	Cloudy.
24	79	78	30.00	29.92	East -	Fresh -	East -	Very fresh	Cloudy and rain.
25	77	78	29.88	29.84	East -	Fresh -	South -	Fresh -	Cloudy and rain.
26	77	78	29.82	29.78	Northeast -	Light -	Northwest	Fresh -	Cloudy and rain.
27	73	75	29.92	29.92	North -	Fresh -	North -	Fresh -	Fair.
28	68	74	30.18	30.10	North -	Brisk -	North -	Fresh -	Fair.
29	66	71	30.14	30.02	North -	Brisk -	North -	Fresh -	Fair.
30	61	67	30.30	30.20	North -	Brisk -	North -	Pleasant -	Fair.
31	67	73	30.28	30.18	North -	Fresh -	North -	Brisk -	Fair.

8.75 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, November 1	72	78	30.28	30.20	North -	Brisk -	North -	Pleasant -	Fair.
2	74	78	30.28	30.16	North -	Pleasant -	Northeast -	Pleasant -	Fair.
3	74	82	30.24	30.14	North -	Light -	Northeast -	Pleasant -	Fair.
4	76	81	30.18	30.12	East -	Brisk -	East -	Light -	Fair.
5	77	82	30.14	30.02	Southeast -	Pleasant -	South -	Light -	Fair.
6	78	86	30.18	30.10	Southeast -	Calm -	Southeast -	Calm -	Fair.
7	77	84	30.28	30.18	East -	Pleasant -	East -	Pleasant -	Fair.
8	77	80	30.30	30.20	East -	Brisk -	East -	Very fresh	Fair.
9	77	80	30.34	30.28	East -	Fresh -	Northeast -	Very fresh	Fair.
10	75	80	30.30	30.24	Northeast -	Fresh -	Northeast -	Brisk -	Fair.
11	75	80	30.28	30.20	Northeast -	Brisk -	Northeast -	Brisk -	Fair.
12	75	81	30.18	30.10	East -	Brisk -	East -	Brisk -	Fair.
13	76	81	30.14	30.10	East -	Pleasant -	East -	Light -	Fair.
14	75	81	30.12	30 08	North -	Light -	West -	Calm -	Fair.
15	74	76	30.16	30.12	North -	Brisk -	Northeast -	Brisk -	Cloudy.
16	74	74	30.20	30.22	Northeast -	Fresh -	Northeast -	Fresh -	Cloudy and rain.
17	72	74	30.32	30.24	Northeast -	Fresh -	Northeast -	Very fresh	Cloudy.
18	74	76	30.26	30.18	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
19	75	74	30.10	30.12	Northeast -	Fresh -	Northeast -	Fresh -	Cloudy and rain.
20	73	80	30.10	29.94	North -	Calm -	North -	Calm -	Fair.
21	74	76	30.08	29.98	Calm -	Calm -	West -	Light -	Fair.
22	72	78	30.12	30.04	North -	Light -	West -	Brisk -	Fair.
23	73	70	30.08	30.16	West -	Brisk -	Northwest	Fresh -	Fair.
24	65	72	30.26	30.08	North -	Brisk -	Northwest	Light -	Fair.
25	69	71	30.14	30.20	North -	Fresh -	North -	Brisk -	Fair.
26	61	66	30.44	30.36	North -	Brisk -	North -	Brisk -	Fair.
27	68	72	30.40	30.30	Northeast -	Fresh -	East -	Fresh -	Fair.
28	70	74	30.40	30.28	East -	Fresh -	East -	Brisk -	Fair.
29	70	74	30.40	30 34	North -	Brisk -	Northeast -	Fresh -	Fair.
30	70	74	30.36	30.30	Northeast -	Fresh -	Northeast -	Fresh -	Cloudy.

6.10 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1837, December 1	69	74	30.32	30.26	North -	Fresh -	Northeast -	Fresh -	Fair.
2	70	74	30.22	30.12	North -	Brisk -	Northeast -	Brisk -	Fair.
3	72	74	30.12	30.10	Northeast -	Fresh -	Northeast -	Fresh -	Cloudy and rain.
4	74	77	30.18	30.10	East -	Light -	East -	Light -	Fair.
5	74	77	30.28	30.18	East -	Light -	East -	Brisk -	Fair.
6	74	76	30.30	30.22	East -	Brisk -	East -	Brisk -	Fair.
7	73	76	30.32	30.18	Northeast -	Brisk -	Northeast -	Brisk -	Fair.
8	73	78	30.18	30.08	Northeast -	Light -	East -	Light -	Fair.
9	75	78	30.14	30.04	East -	Light -	South -	Brisk -	Fair.
10	76	79	30.08	29.98	South -	Light -	Southwest -	Light -	Fair.
11	72	70	30.24	30.26	North -	Fresh -	North -	Brisk -	Fair.
12	72	74	30.30	30.16	East -	Brisk -	East -	Brisk -	Fair.
13	76	78	29.98	29.90	South -	Fresh -	Southwest	Fresh -	Cloudy and rain.
14	73	70	30.06	30.10	West -	Brisk -	W. N. West	Brisk -	Fair.
15	62	68	30.50	30.34	North -	Brisk -	Northeast -	Pleasant -	Fair.
16	70	76	30.32	30.20	East -	Fresh -	East -	Brisk -	Fair.
17	76	80	30.22	30.16	East -	Brisk -	Southeast -	Pleasant -	Fair.
18	76	84	30.15	30.10	Southeast -	Pleasant -	South -	Light -	Fair.
19	76	84	30.18	30.12	South -	Light -	West -	Pleasant -	Fair.
20	68	76	30.44	30.40	North -	Fresh -	North -	Pleasant -	Fair.
21	62	66	30.50	30.44	North -	Fresh -	North -	Brisk -	Fair.
22	63	72	30.48	30.30	North -	Pleasant -	East -	Pleasant -	Fair.
23	70	78	30.32	30.32	East -	Pleasant -	Southeast -	Brisk -	Fair.
24	74	70	30.22	30.28	South -	Fresh -	Northwest	Fresh -	Cloudy and rain.
25	64	68	30.66	30.58	North -	Brisk -	North -	Pleasant -	Fair.
26	68	72	30.62	30.58	Northeast -	Fresh -	North -	Brisk -	Fair.
27	67	72	30.60	30.46	North -	Fresh -	North -	Pleasant -	Fair.
28	67	72	30.48	30.46	North -	Brisk -	North -	Brisk -	Fair.
29	65	70	30.45	30.48	North -	Fresh -	North -	Brisk -	Fair.
30	64	68	30.50	30.46	North -	Fresh -	North -	Brisk -	Fair
31	65	71	30.58	30.42	North -	Pleasant -	North -	Pleasant -	Fair.

2.12 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1838, January 1	68	71	30.46	30.44	North -	Pleasant -	Northeast -	Brisk -	Fair.
2	70	72	30.50	30.40	Northeast -	Brisk -	Northeast -	Brisk -	Fair.
3	70	74	30.44	30.38	Northeast -	Fresh -	Northeast -	Fresh -	Fair.
4	71	74	30.43	30.38	Northeast -	Brisk -	Northeast -	Fresh -	Fair.
5	70	74	30.44	30.36	East -	Pleasant -	Northeast -	Brisk -	Fair.
6	69	73	30.40	30.30	North -	Fresh -	Northeast -	Brisk -	Fair.
7	70	72	30.36	30.32	Northeast -	Brisk -	Northeast -	Pleasant -	Fair.
8	70	74	30.34	30.30	Northwest	Fresh -	Northeast -	Pleasant -	Fair.
9	72	74	30.34	30.33	North -	Brisk -	Northeast -	Brisk -	Fair.
10	71	72	30.30	30.28	North -	Brisk -	Northeast -	Brisk -	Fair.
11	65	68	30.30	30.32	North -	Brisk -	North -	Fresh -	Fair.
12	68	73	30.48	30.48	Northwest	Fresh -	North -	Fresh -	Cloudy.
13	71	74	30.46	30.38	Northeast -	Fresh -	Northeast -	Very fresh	Cloudy & light showers rain.
14	73	78	30.36	30.32	Northeast -	Fresh -	Northeast -	Brisk -	Fair.
15	74	77	30.30	30.28	Northeast -	Light -	Northeast -	Brisk -	Fair.
16	74	80	30.30	30.24	Northeast -	Brisk -	Northeast -	Fresh -	Fair.
17	75	79	30.30	30.24	East -	Brisk -	East -	Pleasant -	Fair.
18	76	82	30.28	30.20	Southeast -	Fresh -	Southeast -	Brisk -	Fair.
19	75	82	30.25	30.04	Southeast -	Calm -	South -	Light -	Fair.
20	75	81	30.22	30.09	Southeast -	Calm -	Southeast -	Light -	Fair.
21	72	68	30.17	30.10	Southeast -	Brisk -	Southeast -	Pleasant -	Fair.
22	64	66	30.20	30.32	North -	Brisk -	North -	Fresh -	Cloudy.
23	66	73	30.30	30.34	North -	Pleasant -	North -	Pleasant -	Fair.
24	71	74	30.34	30.34	North -	Brisk -	North -	Light -	Fair.
25	73	76	30.32	30.24	Northeast -	Light -	Northeast -	Light -	Fair.
26	74	80	30.28	30.22	Northeast -	Light -	Northeast -	Light -	Fair.
27	73	80	30.24	30.16	East -	Pleasant -	East -	Light -	Fair.
28	72	73	30.31	30.22	North -	Light -	East -	Calm -	Fair.
29	72	74	30.30	30.24	Northeast -	Fresh -	East -	Fresh -	Fair.
30	70	75	30.38	30.30	Northeast -	Fresh -	East -	Pleasant -	Fair.
31	73	78	30.32	30.22	East -	Brisk -	East -	Brisk -	Fair.

0.20 inches rain.

METEOROLOGICAL REGISTER—Continued.

Date.	Thermometer.		Barometer.		Winds—morning.		Winds—afternoon.		Character of weather.
	Sunrise.	2 o'clock, P. M.	Sunrise.	2 o'clock, P. M.	Course.	Velocity.	Course.	Velocity.	
1838, February 1	73	78	30.28	30.20	East -	Brisk -	East -	Brisk -	Fair.
2	76	81	30.14	29.98	Southeast -	Brisk -	South -	Light -	Fair.
3	74	71	30.08	30.20	Northwest	Fresh -	Northwest	Fresh -	Cloudy and some rain.
4	58	60	30.60	30.62	North -	Fresh -	Northwest	Fresh -	Fair.
5	50	60	30 72	30.06	North -	Fresh -	North -	Fresh -	Fair.
6	55	64	30.64	30.52	North -	Fresh -	Northeast -	Brisk -	Fair.
7	66	72	30.44	30.34	East -	Fresh -	South -	Brisk -	Fair.
8	73	79	30.28	30.12	South -	Fresh -	South -	Fresh -	Fair.
9	74	78	30.20	30.11	South -	Light -	South -	Brisk -	Fair.
10	69	74	30.40	30.34	North -	Brisk -	North -	Pleasant -	Fair.
11	62	76	30.52	30.38	North -	Brisk -	North -	Pleasant -	Fair.
12	60	71	30.51	30.42	North -	Brisk -	North -	Pleasant -	Fair.
13	70	80	30.24	30.14	Southeast -	Fresh -	South -	Fresh -	Fair.
14	74	83	30.20	30.10	Southeast -	Light -	South -	Light -	Fair
15	76	81	30.16	30.04	South -	Light -	South -	Pleasant -	Fair.
16	76	82	30.12	30.06	South -	Light -	South -	Brisk -	Fair.
17	68	74	30.40	30.34	North -	Fresh -	Northeast -	Light -	Fair.
18	72	78	30.32	30.22	Northeast -	Light -	East -	Light -	Fair.
19	75	80	30.20	30.16	South -	Calm -	South -	Light -	Fair.
20	75	83	30.18	30.04	West -	Light -	South -	Light -	Fair.
21	77	79	30.08	30.02	Southwest	Brisk -	Northwest	Brisk -	Fair.
22	70	67	30.26	30.32	North -	Fresh -	North -	Fresh -	Cloudy & light showers rain.
23	56	65	30.58	30.48	North -	Fresh -	North -	Pleasant -	Fair.
24	58	67	30.58	30.44	North -	Fresh -	North -	Pleasant -	Fair.
25	64	70	30.48	30.38	Nor h -	Pleasant -	Northeast -	Pleasant -	Fair.
26	66	72	30.40	30.38	Northeast -	Brisk -	Northeast -	Pleasant -	Fair.
27	66	72	30.42	30.30	North -	Brisk -	North -	Pleasant -	Fair.
28	67	74	30.36	30.28	Northeast -	Brisk -	East -	Pleasant -	Fair.

0.06 inches rain.

TEMPERATURE IN SANTA CRUZ.

Date.	6½ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1836, December 7	78	79	80	79	77	77	3
8	76	79	80	80	77½	78	4
9	75½	75½	75½	76	75	75	1
10	73¾	76½	79½	79	77½	76½	5¼
11	74	78	78	76¾	76½	76½	4
12	75	75	79	79	77	76	4
13	72½	76	77½	76	76	75½	5
14	74	76	76	76½	74	75	2½
15	73	76	78¼	78½	76½	75	5½
16	73	78	80½	80	77	76½	7½
17	75	78	80½	80	78	77	5½
18	78	79	81½	80	77½	76½	3½
19	76	77½	79	79½	77½	78	3½
20	75	76½	79	79½	77	76½	4½
21	75	77	80	79½	77	76	5
22	75½	77	78½	78½	76	74½	4
23	72	76	78	76½	74	74½	6
24	73½	76½	78	77¾	76	73½	4½
25	73	76¼	76¼	76	73½	73	3¼
26	73	76¼	77½	76	74	73	4½
27	73	74	74½	76	75	74	3
28	73	76	78	77	75½	74	5
29	72	74½	76	77½	76½	74	5½
30	70	73	75	76¼	74	73	6¼
31	73½	75	76¼	76¾	75	74	3¼

NOTES.

Extremes of temperature in twenty-six days, 70 and 81½.

Greatest variation on any day, 7½ degrees. The least variation on any day, 1 degree.

The mean temperature of this month, 75¾ degrees.

Frequent small showers fell during this month, but no one which continued longer than from five to ten minutes. These showers came with short premonition of their approach; and great care was required, while taking a ride or drive, not to be wet by them.

NOTE BY H. P.

For the temperature of Indian Key in December, 1836, and January, 1837, see the meteorological register annexed to the report of the Committee on Agriculture of the House of Representatives, No. 561, February 17, 1838. By comparing the weather at Indian Key and Santa Cruz, during the same five months, from 7th of December, 1836, to 7th of May, 1837, the superiority of Indian Key will be clearly seen, especially in the absence of *frequent showers* during the winter months.

TEMPERATURE IN SANTA CRUZ.

Date.		6¼ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1837, January	1	71½	74½	77	76½	74	73	5½
	2	72	74½	78	78	76	75	6
	3	76	76½	80	80½	78	78	4½
	4	74	75	75½	76½	76	76	2½
	5	76½	77½	80	80	78¾	77½	3½
	6	76	78½	80½	81	79	78	5
	7	76	79	80	81	79	77	5
	8	76	75	76½	78	78	77	3
	9	74	77	80	78	78	75½	6
	10	74	77	80½	79	77½	76	5
	11	74	78½	80	78½	76	75¼	6
	12	75	77	78½	78½	76¼	76	3½
	13	74	77½	78½	78½	76	75	4½
	14	74	77	78	78½	75	74½	4½
	15	74	78	78½	78½	78½	77	4½
	16	73½	77½	77½	77½	76	75	4½
	17	73	77½	79	79	76	75	6
	18	74	78	78	78	77	76½	4
	19	74	80	80½	79½	79	78	6½
	20	75	79	80	80	78	76	5
	21	74¾	79	80	79	78	76	5½
	22	73	78	80¼	80½	80	76	7½
	23	73	76	77	80	78	76	7
	24	76	79	80½	80	78	76	4½
	25	76	77	78½	78	76½	76	2½
	26	75½	77	80½	79¾	77	76	5
	27	76	78	80½	80	76	76½	4½
	28	75½	77	77½	77	76	75½	2
	29	74½	77	80¾	79	78	78	6¼
	30	76	78½	81¾	80	77	78	5¼
	31	76	78	81	80½	77	76	5

NOTES.

The extremes of temperature this month were 71½ and 81¾.

The greatest variation of temperature on any day was 7½ degrees. The smallest variation on any day was 2½ degrees.

The mean temperature of the month was 76.

Frequent small showers occurred in this, as in the preceding month, but with less frequency at its close.

I passed the months of December and January at Frederickstad, or West End. During that time, I lived in No. 10 Strand street, and my thermometer was suspended in the coolest part of the hall of that house. The house fronts west, and is open also to the east; and has a constant draught through its hall whenever the wind is favorable to a passage through it.

TEMPERATURE IN SANTA CRUZ.

Date.	6½ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1837, February 1	77	79½	82	81½	76½	76	6
2	74½	78	81	79	76½	76	6½
3	75	78	81	79½	76	76	6
4	75½	77	77½	79	76	76	3½
5	74	77½	78	79	76	76	5
6	74½	78	81	80½	78	76	6
7	74	77	80	79	78	76	6
8	74½	77½	80	77½	77½	74	5½
9	74½	78	81	80	78	76½	6½
10	75½	78½	81½	81	78	76	6
11	75	77	80	78	76	75	5
12	74	78	81½	79	77½	76	6½
13	75	78½	81	81	78	75½	6
14	75½	76	79	74½	74	73	3½
15	74	76	79	76	75½	76	5
16	74½	78	79	78½	75	75	4½
17	76	78	80	80	77	76	4
18	75½	78	80¼	79	77	75	4¾
19	74	79	79	78¼	74	73½	5
20	74	77¾	79	79	77	74	5
21	74	73½	76½	76	77	75	3
22	73	75	79	79½	76	74	6½
23	73	79	80½	80	76	76	7½
24	73½	76	80	81	76½	75	7½
25	73½	79½	81½	78	76	75½	8
26	74	79	81½	82	76½	75	8
27	74	78	80	78½	76	75	6
28	74	77½	80	77½	76	74	6

NOTES.

On the first day of this month I removed to Bassin, the eastern town of this island; and, till the 22d of the month, lived in a house there upon elevated ground. I thought the air of Bassin drier, and more grateful to the feelings, than that of West End. On the 22d I removed to the Pearl estate, a bleak and almost altogether comfortless situation. There I remained three weeks, and in that time lost more strength than I had gained in the preceding six or eight weeks.

The extremes of temperature this month were 73 and 82.

The greatest variation of temperature on any day was 8 degrees. The smallest was 3 degrees.

The mean temperature of the month was 77½ degrees.

There were two short but heavy showers in this month; one on the 8th, and the other on the 14th. Otherwise the weather was clear and very beautiful.

TEMPERATURE IN SANTA CRUZ.

Date.		6¼ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1837, March	1	74	80	80½	80	77	75	6½
	2	74	76¾	79	78	75½	74	5
	3	72	77½	80	79½	75	74	8
	4	73	78½	80	79¼	76	74	7
	5	72½	78½	80	80	76	75	7½
	6	73	75	79	79	76	74	6
	7	71	75	77½	76¼	73½	72½	6½
	8	70	74	77	76	73½	72	7
	9	68½	74	78	77	75	72	9½
	10	71	74	77	76	74	74	6
	11	72	77	77½	80	76	74	8
	12	72	75	77	77½	75	74	5½
	13	71½	75	79	78	74	73	7½
	14	71½	74	74½	75	74	74	3½
	15	74	76	77	78	76	75	4
	16	74	75	76	77	76	74½	3
	17	74	78	80½	80	78	76	6½
	18	76	79	79	78½	77	76	3
	19	74	76	76½	76½	75	75	2½
	20	75	75½	76	77	76	75	2
	21	74	76	77½	79½	75	74	5½
	22	74	76	79	78	75	73	6
	23	70½	77	77	76	74½	74	6½
	24	67½	78	82	78½	76	74	14½
	25	72	77	80	78	76	74½	8
	26	74	78	78	78	75½	74	4
	27	73½	79½	79	78½	76½	76	5½
	28	76	80	82	81½	77	77	6
	29	77	82	84½	83½	80	79	7½
	30	79	80	84	78	76½	75	9
	31	75½	76	77	77	75	74	3

NOTES.

A cold northerly wind prevailed from about the 7th to the 21st of this month. On the 30th there was a heavy rain, which continued to fall for three hours. Perhaps not a sixth part so much had fallen in the preceding four months.

On the 14th of this month I returned to the house, in Bassin, which I had left three weeks before.

The extremes of temperature this month were 67½ and 84½.

The greatest variation of temperature on any day was 14½ degrees. The smallest variation was 2 degrees.

The mean temperature of the month was 74.

TEMPERATURE IN SANTA CRUZ.

Date.		6¼ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1837, April	1	74	77½	78	77	74	73	5
	2	76	79	78	78	76½	74½	4½
	3	75½	79½	81	79	76	75	6
	4	75½	78½	80	80	77	76	4½
	5	78	83	85	85	80	78	7
	6	77	78	78	81	78½	76½	4½
	7	76½	79	80	79	78	77	3½
	8	77	79	81	83	79	78	6
	9	79½	83	84	85	80	78	7
	10	78	80	83	83	81	79	5
	11	77½	81½	81	80	78	78	3½
	12	78	80	80	80	78½	78½	2
	13	76	79	78	79	78	77	3
	14	77	82	82	82½	80½	78½	5½
	15	78	83	84	83	81	79½	6
	16	79½	81½	84	84	81	79	5
	17	78	80	83½	81½	80	79	5½
	18	78½	81½	83	82	80	79	5½
	19	78	80	82	82	80	78	4
	20	77	82	83	81	80	78	6
	21	77	79½	80	79	79½	80	3
	22	78½	81	80	80	79	78	3
	23	77	80	80	80	79	78	3
	24	78½	81	81	80	80½	78½	2½
	25	79½	83½	83	83	80	77	6
	26	76	82	83½	82	80	78	7½
	27	78	83	84	83	81	78½	6
	28	78	81	84	82	78	79½	6
	29	77	79½	80	80	79	78½	3
	30	76½	80	84	82	80	77	7½

NOTES.

On the 25th of this month I left Bassin, and returned to West End. At the time of leaving Bassin, the country around it had the appearance of almost utter sterility. The canes were yellow from exhaustion of their moisture, the grass was nearly burnt up, and a number of cattle had died from want of water. At West End we found a beautiful verdure, for frequent small showers had fallen there. But the air had become unelastic, and we all withered under its influence.

The extremes of temperature this month were 73 and 85.

The greatest variation of temperature on any day was 7½. The least variation, 2.

The mean temperature of this month was 76.

TEMPERATURE IN SANTA CRUZ.

Date.		6¼ A. M.	9 A. M.	12.	3 P. M.	6 P. M.	9 P. M.	Daily variation.
1837, May	1	78	82	84	82	79	78	6
	2	77	82	84	81½	79	77½	7
	3	78	81	82	81½	80	77	5
	4	78	81	82	81	79	77	5
	5	76	84	85	83½	80	78	9
	6	76	82	82	82	80	77	6
	7	76	82	83	82	79	77	7

NOTES.

The extremes of temperature in the first week in May were 76 and 85.
The greatest variation of temperature on any day was 9, and the least variation 5 degrees.
The mean temperature of this week was 80¼.

Mean temperature of Havana, during every month for five years, from 1825 *to* 1829, *inclusive; and mean temperature of Key West, during every month of six years, from* 1830 *to* 1836, *inclusive.*

The tables from which the first column is taken, were kept by Doctor Ramon de la Sagra, professor in the Royal Botanical garden and director of the pattern plantation near Havana.

The tables from which the second column is taken, were kept by Wm. A. Whitehead, esquire, collector of the customs at Key West, and are published in the American Almanac, for 1838.

Months.	Mean at Havana.	Mean at Key West.	Remarks.
January - -	71.94	69.725	At Key West the means of 1830–'1–'2, were made from three daily observations of a common thermometer; but those of 1834–'5–'6, were from maximum and minimum observations by a self registering thermometer. Hence the mean temperature, thus deduced, although the fairest method, is not calculated to make as favorable a show in comparison with that of Havana, made out in the usual way. Nevertheless, it is seen that the climate of Key West is, at the least, equally uniform in its temperature. The greatest heat and cold, at Key West, were in 1836 as follows: August 15, maximum 89½°, minimum 80°. January 29, maximum 63¼°, minimum 44°.
February - -	75.32	70.502	
March - -	77.88	73.245	
April - -	77.19	75.880	
May - -	78.13	79.436	
June - -	81.75	81.578	
July - -	81.62	82.612	
August - -	80.72	82.760	
September -	80.67	81.304	
October - -	79.30	77.057	
November -	75.21	74.680	
December - -	72.37	70.650	
Mean of years -	77.67	76.622	

"The night of the 28th and 29th January, 1836, was the coldest ever known, the mercury, in a thermometer under cover, falling to 44°, one degree lower than on the 8th February, 1835. The highest temperature in any one year has been 90°, making the greatest range ever known only 46°." Again, it will be seen by the preceding columns that the mean temperature of the six cool months, from the 1st of October to the end of March, inclusive, and of the six warm months, from the 1st of April to the end of September, are as follows :

Six cool months at Havana, 75.32° ; at Key West, 72.64°.
Six warm months at Havana, 80.01° ; at Key West, 80.76°.

It is here expressly repeated, that observations by a self registering thermometer in Havana, in the same years, are requisite for a fair comparison with the results of tables formed on the Florida reef. After all, however, the only positive method of obtaining accurate conceptions of any climate is by a full table of daily observation, such as that kept at Indian Key, by Charles Howe, esquire, during 1836–'7, a copy of which is annexed. The register kept by Joseph Tuckerman, from the 7th December, 1836, to the 7th of May, 1837, in the island of Santa Cruz, is also appended for comparison with the climate of Indian Key, because, although it is not as fairly kept as that of Mr. Howe, it is the only one accessible to indicate the weather of that too celebrated resort for invalids from the United States. To contrast the uniformity of temperature below 28° north latitude, with the variability of temperature above that parallel, we will take the monthly abstract from Dr. Barton's Meteorological Journal, for 1836, in New Orleans, and also his table of temperature by seasons.

Months.	Maximum.	Minimum.	Mean.	Range.
January - - -	70	34	55.00	36
February - - -	69	33	55.50	36
March - - -	75	38	56.75	37
April - - -	79	58	69.25	21
May - - - -	83	64	73.00	19
June - - - -	88	68	78.53	20
July - - - -	89	71	80.08	18
August - - -	87	72	79.72	15
September - - -	86	65	77.12	21
October - - -	81	43	65.11	38
November - - -	73	34	53.81	39
December - - -	74	25	50.19	49
Average - - -	-	-	66.00	29

Average of 1833–'4–'5 *and* '6.

Seasons.	Sunrise.	Midday.	Sunset.	10 P. M.	Maximum.	Minimum.	Average.	Range.
Winter -	47.57	58.46	54.98	1.69	72	28	53	41
Spring -	62.10	70.52	68.23	63.41	86	46	66	27
Summer -	76.72	83.27	80.76	78.29	89	72	79	16
Autumn -	64.29	72.89	70.63	67.13	83	34	68	32

The decimal fractions are omitted in the last four columns. In the summer's sun the average heat was 104.96°. It will be observed, that the temperature was not ever noted at the hottest hour of the day, or at the coldest hour of the night. It is, hence, evident that a self registering thermometer would have given greater extremes of heat and cold. The most important facts for invalids, on the degree and suddenness of the changes on any single day or hour, cannot be ascertained by these tables.

To invalids the relative quantity of rain that falls, in given seasons, is an important consideration in the selection of climate and country. To exhibit the difference in this respect, between the climate of Louisiana and of South Florida, the following condensed statements of the monthly fall of rains at New Orleans and Key West, are selected. The first is obtained from the reports of Doctor Barton, of the monthly amount, in inches, on an average, of four years, including 1836. The second is taken from the reports of W. A. Whitehead, esquire, commencing with October, 1832, and extending through 1833–'4–'5 and '6.

Months.	New Orleans.	Key West.	Excess at New Orleans.	Excess at Key West.
January - - -	4.69	1.819	2.871	
February - - -	2.08	1.337	.743	
March - - -	2.64	1.983	.657	
April - - -	5.31	1.087	4.223	
May - - -	2.44	6.341		3.901
June - - -	6.17	2.388	3.782	
July - - -	5.03	2.839	2.191	
August - - -	5.24	3.297	1.943	
September - - -	5.79	4.350	1.440	
October - - -	1.29	3.330		2.040
November - - -	3.10	1.491	1.609	
December - - -	2.97	1.127	1.843	
Total inches - -	47.35	31.389	21.302	5.941

It, hence, appears that on the average, for a whole year, upwards of fifty per cent. more rain falls at New Orleans than at Key West. But during the six months, from the 1st of November to the 1st of May, the period generally spent abroad by invalids from the northern States, the proportion of rain in New Orleans to that in Key West is 20.99 inches to 8.84, or upwards of 234 per cent.! It should, also, be remembered that in tropical climates the same quantity of rain falls in a much less time than in the intemperate climates of the variable zone; that the rains consist of short but copious showers, and that the sky is clear immediately before and after the showers; and that, hence, the proportion of clear skies and fair days are infinitely greater in those regions. The detailed Meteorological Register of Indian Key will illustrate all the advantages of its peculiarly favorable climate.

To form some conception of the relative temperature of Albany, New York, of New Orleans, Louisiana, and of Key West, Territory of Florida, the mean monthly and annual temperature are appended in parallel lines, omitting fractions.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Albany -	23	16	27	42	59	65	72	64	60	42	36	26	44
New Orleans -	55	55	56	69	73	78	80	79	77	65	53	50	60
Key West -	69	70	73	75	79	81	82	82	81	77	74	70	76

The average annual rains amount in inches, at Albany, to 40.33, at New Orleans, to 47.35, and at Key West, to 31.38.

Extremes of temperature, &c., in 1836.

	Months.		Months.		Annual range.	Greatest monthly.
Albany -	February 5	16	July 8	93	109	60
New Orleans -	December –	25	July –	89	64	49
Key West -	January 29	44	August 15	89¾	45¼	19¼

It must here be repeated that, from the tables kept at New Orleans, it does not appear that the extremes of heat, at the hottest moment of the day, or of cold, at the coldest moment of the night, were accurately noted by means of a self-registering thermometer.

HENRY PERRINE.

WASHINGTON, D. C.,
February 26, 1838.

DOCUMENT NO. 4.

GEOGRAPHY OF PLANTS.

List of officinal and economical plants.—List of agricultural plants of Cuba; all of great importance to the agricultural community of the United States in general, and of Florida and the southern States in particular.

Under this head is to be considered the manner in which plants are affected by climate or station, and the conditions under which particular forms of vegetation are confined to certain zones of temperature; as the palms to the tropics, the true pines to extra-tropical regions.

This is one of the most curious and difficult subjects with which we can occupy ourselves. It embraces a consideration of the constitution of the atmosphere, and geological structure of all parts of the globe; and of the specific effects of particular conditions of climate and soil upon vegetation: all points of extreme importance, concerning which existing data are rarely sufficient to enable us to arrive at satisfactory conclusions. It involves the discussion of the plan upon which the world was originally clothed with verdure; and, as Humboldt most truly observes, it is closely connected with "the physical condition of the world in general. Upon the predominance of certain families of plants in particular districts depend the character of the country, and the whole face of nature. Abundance of grasses, forming vast savannahs, or of palms, or coniferæ, have produced most important effects upon the social state of the people, the nature of their manners, and the degree of development of the arts of industry."*

If we examine the surface of the globe, we shall find its vegetation varying according to its inequalities and its differences of soil; we shall see that the plants of the valleys are not those of the mountain, nor those of the marsh like the vegetables of the river or of dry grounds; it will also be seen that the vegetation of all valleys, all mountains, marshes, or rivers, has a similar character in the same latitudes. The flora of the granitic mountains of Spain and Portugal is very different from that of the calcareous mountains of the same kingdoms; in Switzerland. Teucrium montanum always indicates a calcareous soil: and the same may be said of certain orchises, ustulata, and hircina, for instance, in our own country. Hence it is inferred, that the differences in the character of vegetation depend upon circumstances connected with the soil or atmosphere in which they grow. A great deal of ingenious discussion upon this matter will be found in De Candolle's article on botanical geography, published in the 18th volume of the *Dictionnaire des Sciences Naturelles*.

But as I do not observe much that can be called positive deductions from such facts as have been ascertained, I shall, without entering into speculations as to the causes why one description of plants grows in one situation, and others in another, confine myself to an exposition of the mere facts which appear to have been hitherto distinctly ascertained.

* So the character of the vegetation in tropical Florida will ultimately create a very dense population of small cultivators, and of family manufacturers of numerous diversified products, which will thus prevent excessive over-production, or ruinous rivalry, in any single branch of culture or of manufactures.
H. P.

It has been found convenient to divide the surface of the earth into different stations, when treating of botanical geography. In this part of the subject I shall adopt the arrangement and distinctions of De Candolle; agreeing with him that they at least indicate the most remarkable differences of station, if they are not susceptible of any rigorous definitions.

He admits the following classes:

1. **Maritime*, or saline plants; that is to say, those which, without being plunged in salt water, and floating on its surface, are nevertheless constrained to live in the vicinity of salt water, for the sake of absorbing what may be required for their nourishment. Among these it is requisite to distinguish those which, like the salicornia, grow in salt marshes, where they absorb saline principles, both by their leaves and roots, from those which, like roccella fuciformis, exist upon rocks exposed to the sea air, and appear to absorb by their leaves alone; and finally, a third class, such as eryngium campestre, which do not require salt water, but which live on the sea-coast, as well as elsewhere, because their constitution is so robust that they are not affected by the action of salt.

2. *Marine plants*, also called Thalassiophytes by M. Lamouroux, which live either plunged in salt water or floating on its surface. These plants are distributed over the bottom of the sea, or of salt water, in proportion to the degree of saltness of the water, the usual degree of its agitation, the continuity or intermittence of their immersion, the tenacity of the soil, and perhaps, also, the intensity of the light.

3. *Aquatic plants*, living plunged in fresh water, either entirely immerged, as confervæ; or floating on its surface, as stratiotes; or fixed in the soil by their roots, with the foliage in the water, as several kinds of potamogeton; or rooted in the soil, and either floating on the surface, as nymphæa: or rising above it, as Alisma plantago. This last division is very near the following class.

4. †Plants of *fresh water marshes*, and of very wet places, among which it is chiefly necessary to distinguish those of bogs, of marshy meadows, and of the banks of running streams; and, finally, those of places inundated in winter, but more or less dried up during the summer.

5. Plants of *meadows* and *pastures*, in the study of which it is requisite to distingush those that, by their natural or artificial association, form the turf of the meadow, and those others which grow mixed together with the greatest facility.

6. Plants of *cultivated soil*. This class has been entirely produced by the agency of man. The plants which grow in cultivated land are those which, in a wild state, preferred light substantial soils. Many have been transported from one country to another with the seeds of other cultivated plants. Those individuals of the same species which are found in fields, vineyards, and gardens, are often different in some respects, according to the peculiar manner in which they have been cultivated.

* On the low coral islands of the Pacific, the cocoa-nut palm flourishes. As most of these coral-rock islets have neither streams nor springs of fresh water, the inhabitants would perish of thirst were it not for the water of the cocoa-nut. This wonderful tree is now thriving on even Indian Key, a coral-rock of only twelve acres, on the Florida Reef. H. P.

† Embracing many valuable species of the [illegible] palms and of bananas. The best Sago palm inhabits only low, marshy spots; and a good Sago plantation or forest, is a bog knee-deep. The fibrous leaved Tucu palm of Brazil prefers marshy grounds; and the Moriche palm of the Oronoco flourishes on islands, inundated by the freshets of the river, one half the year, and by the tides of the sea, twice a day, during the other six months. The Gomuty palm which furnishes "black cordage," is a native of the swampy forests of Sumatra. H. P.

7. *The plants of rocks*; these pass by insensible gradations to those of walls, rocky and stony places, and even of gravel; and the latter soil, as its fragments diminish in size, conduct us by degrees to the following class. Rock plants offer some remarkable singularities, depending upon the nature of the rock.

8. *The plants of sands*, or of very *barren soils*; in the classification of which much difficulty is experienced: thus, plants of the sand of the sea shore are confounded with saline plants; those of barren soil, with the species of cultivated land; and those of coarse sand are not different from those of gravel.

9. Plants of *sterile places*, that are very compact, as stiff clayey soil, or such as have their surface hardened by drought or heat, or those which are trodden hard by man or animals. This is an heterogeneous class, and contains plants of very uncertain characters.

10. *Plants which follow man.* These are few in number, and more fixed in their station, either in consequence of nitrous salts being necessary to their existence; or because, perhaps, azotized matter is required for their nutriment.

11. *Forest plants*, among which are to be distinguished. 1stly, the trees that form the forest; and, 2dly, the herbs which grow beneath their shade. The latter are to be separated into two kinds; those, 1st, which can support a considerable degree of shade during all the year, which are found in evergreen woods;† or such, 2d, as require light in the winter, like those which are found among deciduous trees.

12. *Bushes and hedge plants.* The shrubs which compose this division differ from the plants of the forest in their smaller size, and by the thinness of their leaves; the herbaceous kinds that grow among them are ordinarily climbing plants.

13. *Subterranean plants*, which live either in dark caverns, as the byssus, or within the bosom of the earth, as the truffle. These can dispense altogether with light, and several cannot even endure it. Plants that grow in the hollows of old trees have great analogy with those of caverns.

14. *Mountain plants*, as subdivisions of which all the other stations may be taken. We generally class among mountain plants such as, in Europe, are not found lower than 500 yards; but this is quite an arbitrary limit. The most important division is between those which grow on mountains, the summit of which is covered with eternal snow, and those of mountains which lose their crest of snow in the summer. In the former, the supply of water is not only continual, but more abundant and colder as the heats of summer advance; in the latter, on the contrary, the supply of water ceases when it becomes most requisite. The former are evidently much more robust than the latter.

15. *Parasitical plants*; that is to say, such as are either destitute of the power of pumping up their nourishment from the soil, or of elaborating

* The pethaya, or strawberry pear of Yucatan, a most delicious fruit, better named strawberry pineapple, is produced by a creeping triangular species of cactus or prickly pear, which climbs to the tops of stone walls, and appears to be nourished by the air alone. The Sisal hemp agaves, of Yucatan, flourish both on the very stony surfaces of the interior, and the very sandy shores of the coast. The medicinal aloes will thrive in the most dry and barren soils.

† These ever-shaded plants of ever green woods, embrace a very great number of very valuable vegetables of the tropics; e.g. the celebrated chocolate shrub; the flax pine apple leaves; the climbing fragrant vanilla pods; and many important plants for food, clothing, medicine, and the arts.

H. P.

it completely; or as cannot exist without absorbing the juices of other vegetables. These are found in all the preceding stations. They may be divided into, first, those which grow on the surface of others, as the Cuscuta and the Misletoe: and, secondly, intestinal parasites, which are developed in the interior of living plants, and pierce the epidermis, to make their appearance outwardly, such as the Uredo and Æcidium.

16. *Epiphytes*, or *false parasites*, which grow upon either dead or living vegetables, without deriving any nourishment from them. This class, which has often been confounded with the preceding, has two distinctly characterised divisions. The first, which approaches true parasites, comprehends cryptogamous plants, the germs of which, probably carried to their stations by the very act of vegetation, develop themselves at the period when the plant, or that part where they lie, begins to die. then feed upon the substance of the plant during its mortal throes, and fatten upon it after its decease; such are Nemasporas and many Sphærias: these are *spurious itestinal parasites*. The second comprehends those vegetables, whether cryptogamic, such as lichens and Musci, or phanerogamous, as Epidendrums, which live upon living plants, without deriving any nutriment from them, but absorbing moisture from the surrounding atmosphere; these are *superficial false parasites*. Many of them will grow upon rocks, dead trees, or earth.

Thus we see that De Candolle has found it necessary to divide vegetation into sixteen stations. I do not attach much importance to several of them, because they are vague and uncertain of application, and frequently common to many plants; but it is, nevertheless, useful to bear in mind, that such distinctions do exist, and to point them out whenever they take any very decided peculiarity of character. This is, indeed, indispensable, in order to enable us hereafter to form any definite appreciation of the nature of the influence of the combined agency of soil, temperature, and atmosphere.

The next, and by far the most important head under which the geographical distribution of plants is to be considered, is with reference to temperature and light. These depend, firstly, upon latitude; and, secondly, upon elevation above the sea.

As we proceed from the pole towards the equator, we find the temperature gradually increasing; and as we ascend from the surface of the ocean up into the atmosphere, we find the temperature gradually decreasing, until we reach a point at which perpetual frost holds his throne, and where vegetation ceases.

In like manner we find, as we recede from the equator to the pole, we quit the country of palms and other arborescent monocotyledonous plants, for the habitations of deciduous dicotyledonous trees, Coniferæ, and cryptogamic plants; and that, as we rise into the atmosphere, as considerable a change takes place. Thus, in Teneriffe, the foot of the mountain is occupied by Crithmum latifolium, succulent Euphorbias, Plocama Pendula, and Prenanthes spinosa: to these succeed vines, corn, Canarina campanula, and Messerschmidia fruticosa: a third class, consisting of laurels, Ilex, Ardisias, heaths, and Viburnums, occupy the succeeding tract. These are surmounted by pines, Cytisus, and Spartium microphyllum; and, finally, the scenery is closed by Spartium nubigenum, Juniperus oxycedrus, Scrophularia, Viola, and Festuca. (See Humboldt's Travels.)

Therefore, in considering the matter of the vegetation of a given climate,

it is necessary to take into account the temperature *peculiar to the latitude itself*, and the reduction *caused by elevation.*

The decrement of caloric, as we ascend into the air, will be understood by the following table, calculated by Daniell, from observations made by Mr. Green, the aëronaut, in an aërial voyage performed in 1821. These are particularly instructive; because they were all made within the space of half an hour, under circumstances which varied as little as possible.

The temperature at the surface of the earth was - - -	- 74°
at an elevation of 2,952 feet, was - -	- 70°
7,288 - - - -	- 72°
9,993 - - - -	- 69°
11,059 - - - -	- 45°
11,293 - - - -	- 38°

The difference between the temperature of the highest elevation and the earth's surface amounting to 36° in the space of twenty-seven minutes.

The amount of the decrement of heat, as compared with that of latitude, has been calculated to be, in France, equal to one degree of retrogressive latitude for every 540 feet of vertical elevation; that is to say, the temperature of a district of 3,240 feet of elevation, in 45° north latitude, would be equal to the temperature of 51° north latitude on a level with the sea. But, from Humboldt's computations, it appears that, nearer the equator, this proportion varies. He found, from careful and repeated observations, between 0 and 3,000 feet of elevation, that, in the middle of the temperate zone, the mean temperature of the year decreased in a degree equivalent to 2° of north latitude for every 600 feet of elevation; the mean summer heat, 1° 30′; the mean autumnal heat, 1° 24′; or, on an average, the decrement of temperature was about 1° of latitude for every 396 feet of elevation. Temperature decreasing in this rapid ratio, it is evident that, if vegetation is affected by temperature, it will offer great differences in the ascent of a mountain. And, accordingly, it is found, as will be seen by the following tables, that the nature of the vegetation, towards the upper limits at which plants grow, gradually changes from that of the base of the mountain, until plants entirely disappear at the limits of perpetual snow.

Note.—The people of the United States annually bestow several hundred thousand dollars for the support of missionaries and their families in foreign countries, who could render an equivalent to their fatherland by the transmission of useful plants. Owing to the niggardly mode of managing our consulates, the consuls, in general, are obliged to depend on mercantile pursuits for a subsistence; and, hence, neither their interests nor their habits will enable them to aid in the introduction of valuable vegetables. H. P.

Note.—In the green-houses and hot-houses of the Northern United States, and of Northern Europe, there are hundreds of very valuable vegetables of the tropics, which serve as merely objects of costly curiosity to their owners; but which, transferred to tropical Florida, will become important articles of practical utility to our confederation, and to all the civilized world. H. P

Note.—All the coffee of America proceeds from a single plant brought from the garden of plants in Paris; and the subscriber is now expecting, weekly, from the same garden, the first suckers of the Musa Abaca or Manilla hemp banana. H. P

CHIMBORAZO, (ANDES.)

Lat. 2° 30′ S.—Height, 21,450 feet.

Elevation in feet.	Mean temperature.	Vegetation.
0	Of the year - - 80°	Palms.
3,250	Of the year - - 71°	Palms cease to grow.
5,200	Of the year - - 66°	Tree ferns cease.
9,750	Of the year - - 60°	Cinchonas cease.
11,375	Of the year - - 46°	Alstonias and Befarias cease.
13,325	- - - -	Grasses cease.
14,300	- - - -	Culcitium rufescens ceases.
15,600	Of the year - - 29°	Limits of perpetual snow.

POPOCAYAN, (MEXICO.)

Lat. 19° 20′ N.—Height, 17,550 feet.

Elevation in feet.	Mean temperature.	Vegetation.
10,400	Of the year - - 53°	Oaks cease to grow.
11,375	- - - -	Alnus Mexicana ceases.
13,000	Of the year - - 44°	Pinus occidentalis ceases.
15,275	- - - -	Limits of perpetual snow.

ETNA, (SICILY.)

Lat. 38° 6′ N.—Height, 11,360 feet.

Elevation in feet.	Mean temperature.	Vegetation.
0 to 100	Of the year - - 64°	Palmæ, Musaceæ, Saccharum.
	Of July and August - 76°	
1,100	- - -	Oranges, olive, and rice, cease to grow.
2,175	- - -	Vine, wheat, and maize, cease.
4,350	- - -	Oaks and chestnuts cease.
6,500	- - -	Rye and pinus sylvestris cease. Fagus sylvestris and Betula become shrubs.
8,125	- - -	Juniperus and Berberis cease.
9,750	- - -	Phænogamus plants disappear.
10,000	- - -	Lichens cease.

MONT BLANC, (ALPS.)

Lat. 44° N.—Height, 15,600 feet.

Elevation in feet.	Mean temperature.		Vegetation.
0	Of August	69°	
0	Of the year	53°	
1,950			The vine ceases.
2,925			Castanea vesca ceases.
3,900			Oaks cease.
4,680			Betula alba ceases.
5,850			Pinus abies ceases.
6,695	Of the year	32°	Rhododendrons cease.
7,800			
8,190			Salix herbacea ceases.
8,780			Limits of perpetual snow.

MONT PERDU, (PYRENEES.)

Lat. 44° N.—Height, 11,375 feet.

Elevation in feet.	Mean temperature.		Vegetation.
3,250	Of the year	42°	
5,280			Oaks cease to grow.
6,175			Pinus picea ceases.
7,800			Pinus rubra and uncinata cease.
8,780	Of August	42°	Limits of perpetual snow.
	Of the year	25°	

SULITELMA, (LAPLAND.)

Lat. 68° N.—Height, 6,175 feet.

Elevation in feet.	Mean temperature.		Vegetation.
0	Of the year	34°	
	Of August	60°	
957	Of the year	31°	Pinus sylvestris ceases.
1,950	Of the year	27°	Betula alba ceases.
	Of August	54°	
2,925			Salix herbacea and lanceolata cease.
3,640	Of the year	21°	Limits of perpetual snow
	Of August	49°	

The effect of elevation is not, in Europe, the same with all plants; there are many that grow indifferently upon the plains and upon mountains as high as perpetual snow. De Candolle speaks of 700 instances, with which he is acquainted, of the prevalence of this law. But, on the other hand,

there are many plants, the limits of which are strictly circumscribed by elevation or equivalent temperature; as, for example, the chestnut does not rise higher in the Swiss Alps, in the parallel of 45°, than 2,400 feet: on Etna, in latitude 38°, it reaches no higher than 4,000 feet. Many of the plants found on plains in the north of Europe occupy the mountains of the south. The olive, in 44° of latitude, its most northern range, will not grow at a greater elevation than 1,200 feet. In general, it is found that, as we approach the equator, vegetation becomes more and more affected by elevation; and that, as we recede from it, the effects of elevation gradually cease.

The *cause* of the influence of elevation upon plants is ascribed, in the first place, to reduced temperature; secondly, to a greater intensity of solar light; and, thirdly, to a decrease in humidity. The rate at which temperature decreases as we ascend from the surface of the earth, varies according to latitude: Humboldt has shown that, in the temperate and torrid zones, the decrement of heat is essentially different. In the equatorial zone, the temperature of the region lying at the height of between 3,000 and 6,000 feet, on which the clouds repose that are visible to the natives of the plains, decreases much more slowly than either above or below that elevation; but, in the temperate zone, the decrease is more gradual. In proof of this, the following table has been formed by Humboldt:

Elevation above the sea in feet.	Equatorial zone. Lat. 0°—21°.		Temperate zone. Lat. 45°—47°.	
	Mean temperature of the year.	Difference.	Mean temperature of the year.	Difference.
0	80°	12°	53°	12°
3,000	68°	4°	41°	9°
6,000	64°	9°	32°	9°
9,000	55°	11°	23°	
12,000	44°	10°		
15,000	34°			

The diminution of the density of the air, as we ascend, produces a corresponding increase in the intensity of the light; a circumstance in which high elevation has been said to correspond with high latitudes; but this is doubtful.

It is said that the humidity of the atmosphere decreases as we ascend, and that to this may be ascribed much of the effect produced upon vegetation by great heights. That the humidity of the atmosphere does much affect vegetation is not to be doubted; and, if it were certain that the air became gradually drier as we ascend, a second cause, as powerful as that of temperature, would be found for the effects of elevation upon vegetation. But it is certain that the humidity of the air does not change gradually, as we ascend, with the character of vegetation; on the contrary, it has been

found that atmospheric humidity is either uniform or increased to heights far beyond uniformity of vegetation, and then suddenly diminishes to a large amount, vegetation not suddenly altering with it; so that it would seem as if the atmosphere were composed of deep beds of air, suddenly differing from each other in the elasticity of their aqueous vapor.

From observations made by Captain Sabine, with a Daniell's hygrometer, at Ascension, it appears that on that island, at 17 feet above the sea, the amount of dryness was 5°; and, at 2,237 feet higher, was 3° 5′; so that, in this case, the air became more humid as he ascended. At Trinidad, the amount of dryness on a level with the sea was 5°; at 1,060 feet higher, the air was *saturated* with moisture; in this instance, also, humidity increased with elevation. At Jamaica it was found that, on a level with the sea, the degree of dryness was 7°; at 4,080 feet higher, the air was saturated with moisture; but at 4,580 feet the dryness was 16°. Hence it is to be inferred that, in these observations, the lower bed of the atmosphere was not passed through, either at Ascension or in Trinidad; but that, in Jamaica, it had been left below at the time the third observation was taken; and that, in that island, the lower stratum of air is something more than 4,000 feet deep. In Mr. Green's voyage, the degree of dryness of the air, at an elevation of 9,893 feet, was 5°, nearly the same as it was observed to be on the surface of the earth below at the same time; but at 11,059 feet it was 13°; and at 11,293 feet, the highest point at which an observation was made, it was still 13°; so that it would seem that the humidity of the atmosphere, at that time, did not vary through a bed of air rising, perhaps, 2,000 feet beyond the highest limits of vegetation in Europe.

It must be confessed that these observations are by no means sufficiently numerous to become the foundation of anything connected with the effect of elevation upon the characters of plants; but they, at least, answer the purpose of showing that, in the present state of our information, the effects of humidity are not appreciable in investigating the subject.

Whether the increased rarity of the air, as we ascend, has any effect upon vegetation, is not determined. It is not easy to say in what way it can act, according to any yet known physiological laws, unless, as De Candolle remarks, in supplying an insufficient quantity of oxygen for absorption. But, as we find plants of the plains grow indifferently on the highest mountains, it does not seem that there is any such diminution of oxygen as interferes with the operations of vegetation. The diminution of atmospheric pressure, which, of course, takes place at high elevations, may facilitate evaporation; but we have yet to learn in what precise way that phenomenon influences vegetation.

From what has now been said, all that is apparent is that, as we ascend in the atmosphere, temperature diminishes, and light increases, in a proportion corresponding, to a certain degree, with the climate of higher latitudes; but even to this there are exceptions, depending upon particular circumstances, and especially upon the amount of summer heat, of which more will be said presently. Thus, at Enontekissi, in Lapland, in 68° 30′ north latitude, at an elevation of 1,356 feet above the sea, a climate which, from it situation, should be scarcely clothed with herbage, Von Buch found corn, orchards, and a rich vegetation.

Having now seen what great differences are produced in the characters of vegetation by elevation above the sea, let us next take a view of the influence caused by latitude. In the countries lying near the equator, the vege-

tation consists of dense forests of leafy evergreen trees, palms, and arborescent ferns, among which are intermingled epiphytal herbs and rigid grasses: there are no rich verdant meadows, such as form the chief beauty of our northern climate; and the lower orders of vegetation, such as mosses, fungi, and confervæ, are very rare: myrtaceæ, melastomaceæ, musaceæ, piperaceæ, scitamineæ, and frutescent compositæ, abound. As we recede from the equator, these gradually give way to trees with deciduous leaves, to coniferæ, rosaceæ, and amentaceæ; rich meadows appear, abounding with tender herbs; the epiphytal orchideæ disappear, and are replaced by terrestrial fleshy-rooted species; mosses clothe the trunks of aged trees; decayed vegetables are covered with parasitical fungi; and the waters abound with confervæ. Approaching the poles, trees wholly disappear; dicotyledonous plants of all kinds become comparatively rare; and grasses and cryptogamic plants constitute the chief features of vegetation. To what cause, except that of temperature, and perhaps light, these effects are to be ascribed, is unknown. They are found to exist equally towards either pole; and it is evident, from the uniform manner in which the influence of the controlling cause, whatever it may be, is exercised, that the laws under which the geographical distribution of plants is determined, are as certain and immutable as any of those with the nature of which we are acquainted. It is probable that temperature is the principal cause, from the well known fact that the vegetable productions of hot climates can be successfully cultivated in cold ones by the aid of heat; and that the plants of cold climates may be cultivated in hotter climates by an artificial reduction of temperature. But that other causes also operate is apparent from the impossibility of cultivating the plants of any high latitudes in those considerably to the south. Thus, when living plants were brought to England from Melville island, no means, whatever, could be discovered of keeping them alive, although the temperature at which they were maintained did not materially vary from that to which they must have been often exposed in the summer season, in their own climate. Assuming, however, for the present, that temperature is the most efficient cause of variety in the distribution of plants, the first point to consider is, how far temperature and latitude are uniformly the same in either hemisphere. This has been discussed, with his habitual skill, by Humboldt, of whose observations I must avail myself in nearly all that I can say upon the subject. According to this observer, the geographical parallels of latitude do not indicate corresponding temperature, either in the old and new world, or in the northern and southern hemispheres. In the new world, the temperature decreases more rapidly as we recede from the equator than in the old world; and in the southern hemisphere, beyond the parallel of 34°, the summers are colder than in corresponding latitudes of the northern hemisphere, but the winters milder. On this account, Humboldt concludes that "the lines of equal mean annual heat, which may be called *isothermal*, are not parallel with the equator, but intersect the geographical parallels at a variable angle."

The following table shows the difference in the mean annual heat of the same latitudes in the old and new worlds:

Latitude.	Mean heat of the year in the		Difference.
	Old World.	New World.	
0°	80°	80°	0°
20	77	77	0
30	70	67	3
40	63	54	9
50	50	38	12
60	40	24	16

Hence it appears that the old world is much warmer than the new, and that the temperature of America does not decrease, from Florida to the Gulf of St. Lawrence, in the same ratio as in Europe, from Egypt to Scandinavia. But although, in the temperate parts of North America, the mean annual heat of a given place is the same as that of Europe some degrees more to the northward, yet the temperature of particular seasons does not accord in the same degree; but the colder the winters the hotter the summers are found. Thus:

The summer of Philadelphia, lat. 39° 56′ N. is the same as that of Rome - - - - - - lat. 41° 53′ N.
The winter of Philadelphia, lat. 39° 56′ N. is the same as that of Vienna - - - - - - lat. 48° 13′ N.
The summer of Quebec, lat. 46° 47′ N. is hotter that that of Paris - - - - - - lat. 48° 50′ N.
The winter of Quebec, lat. 46° 47′ N. is colder than that of St. Petersburgh - - - - - - lat. 59° 56′ N.

In general, the summers of the temperate parts of North America, as far as 40° north latitude, are about 4° warmer than in Europe under the *same isothermal parallel*; whence it can be understood why magnolias and other equinoctial-looking trees extend so far to the north, since, in the parallel of 36°, the summer heat to which these trees are exposed scarcely differs from the mean annual heat of the equator. It is, therefore, extremely important in the study of botanical geography, to take into account, not only the mean temperature of the year, but also **the mean summer heat.***

* I do not attach much faith to the inferences drawn from the mean heat of any season or year. The extremes of heat and cold, and the suddenness of the vicissitudes, afford much better data. The plants which are destroyed by our sudden vicissitudes of temperature in the United States, are not directly killed by cold, but are killed by the speedy subsequent heat. Hence, they are not destroyed in the coldest days or nights of winter, but are d stroyed after the frosts of spring and of autumn. The sudden application of heat to frozen plants, as well as to frozen animals, induces gangrene. Hence, also, shade is a preventive of damage; and hence, also, the great success of John Michel, Esq, in his small but crowded garden in Charleston, South Carolina, where, under the principle of the mutual protection of plants, he exhibits the fruits of our northern States flourishing in company with fruits of the torrid zone. Hence, also, in Baltimore, the tender plants in the yards on the south sides of houses have been destroyed, while those in the shade of the north side have escaped damage throughout the winter. Hence, also, the acclimation of tropical plants in the southern States should be commenced in the evergreen forests of pines and magnolias, which afford protection, not only by mechanically breaking the force of the bleak northern blasts, but also prevent radiation from reducing the temperature of the tenderer undergrowth; and, furthermore, by their ceaseless vegetation, keep up a notable degree of warmth in the surrounding atmosphere.
H. P.

According to Barton, the climate to the *west* of the Alleghany mountains is much warmer than that on the east, or Atlantic side, where the same plants exist 3° or 4° higher up on the west than on the east side of the range. It is probable, however, that this difference does not extend higher up than Lake Erie, in 42° north latitude; for, both beyond Lake Superior and Hudson's Bay, the earth is said to be constantly frozen at three feet from the surface; a phenomenon which also occurs in Siberia, about the river Lena, in about 62° north latitude, near the town of Jakutsk; while, in Lapland, in 70° near Vadsoe, the temperature of the earth is found to be as much as 3° or 4° above the freezing point; whence it appears that the climate of the north of Europe is warmer than that of the same latitudes in Asia and America. We therefore shall not be far away, if we conclude that the isothermal lines bend towards the tropics in Europe, and towards the poles in Tartary and America.

As we approach the equator there appears to be little difference in the mean temperature of the year, either in the new or old world.

Of the old world.

The mean temperature of Senegal is 79.7° in lat. 24° 30′ N.
of Madras is 80.4° in lat. 13° 5′ N.
of Batavia is 77.4° in lat. 6° 10′ S.
of Manilla is 78.0° in lat. 15° N.

Of the new world

The mean temperature of Cumana is 81.6° in lat. 10° 27′ N.
of the Antilles is 81.6° in lat. 15° N.
of Vera Cruz is 78.0° in lat. 19° 12′ N.
of Havana is 78.0° in lat. 23° 12′ N.

It is probable, however, that the summers of Asia are more fervid than those of America; for, according to Roxburgh, the mean temperature of Madras, in latitude 13° 5′ north, in the month of July, is 89.4°; while that of Cumana, in latitude 10° 27′, does not exceed 84.4°.

To the south of the equator, the temperature of the east seems to be higher than that of corresponding latitudes in the west; thus, the mean temperature of the Mauritius, in 20° 9′ south latitude, has been ascertained to be 80.4°; while that of Rio Janeiro, in latitude 20° 59′ south, is as low as 74.3°; and at the Havana, in nearly the same parallel in the northern hemisphere, it ranges between 77° and 77.9°. The whole of the western coast of South America, as far as the sands of Peru, in latitude 10° and 14° south, are affected so much by the continual prevalence of clouds and the low temperature (59.9°) of the currents setting round Cape Horn, that the mean temperature of the year in those parts does not exceed 68° or 69°. Hence, the plants of Lower Peru* live in a temperature not exceeding, by day, 68° or 72°, and by night 59° or 62°. Near the coast Humboldt observed the thermometer

* Hence, all the valuable plants of Lower Peru should be speedily transferred to tropical Florida. From meteorological tables kept at Key West six years, from 1830 to 1836, the mean annual temperature is 76.62°; the mean semi-annual, for the cool months, from 1st of October to 31st of March, is 72.64°; and for the six warm months, from 1st of April to 30th of September, it is 80.76°. H. P.

as low as even 55.4° in 12° 2′ south latitude. With this exception, there is little difference in the temperature of the southern hemisphere as low as 34° south latitude, either in New Holland, Africa, or America. The mean temperature of Port Jackson, in 33° 51′ south latitude, has been ascertained to be 66.6°; of the Cape of Good Hope, in 33° 55′ south latitude, to be 66.8°; and of Buenos Ayres, in 34° 36′ south latitude, to be 67.6°. In the northern hemisphere the mean temperature, in latitude 34°, is 67.8°. It is extremely probable that, as far as the parallel of 57° south latitude, the differences in the temperature of the two hemispheres are greater in the summer than the winter. The cold of the Falkland islands, in latitude 51½° south, is less than that of London in the same latitude to the north. The arborescent ferns and epiphytal Orchideæ are often injured by the cold in Van Dieman's island, latitude 42° south; and in the southern part of New Zealand, latitude 46° south, Cook observed, in latitude 43°–44° south, in July in the middle of winter, that the thermometer at noon was usually between 46° and 51°.* At Rome, latitude 41° 53′ north, the thermometer at noon in January rarely reaches 51°–53°; in Paris the mean noon-day temperature of January is, according to Arago, 38.7°. For this reason it is supposed that the climate of the southern hemisphere does not differ from that of the north so much in the greater coldness of the winters as of the summers. According to Humboldt, the greatest heat in the parallels of 48° and 58° of south latitude does not exceed 43.7°–46.8°; while at St. Petersburgh and Umea, in 59° 66′ and 63° 50′ north latitude, it is 65.2° and 62.6°. In the Straits of Magellan, between 53° and 54° south latitude, snow falls almost daily in the middle of summer; and, in the same place, in the middle of December, the sun not setting for eighteen hours together, Krusenstern observed that the thermometer never rose higher than 52°; while, on the contrary, Von Buch remarked it as high as 79.4° in Lapland under the parallel of 70°. In 60° south latitude, which nearly answers to the position of St. Petersburgh in the northern hemisphere, Cook and Forster found the temperature at midsummer not higher than 36°; and icicles were continually forming on their ship. Even in the extreme points of Lapland, in 70° north latitude, the pines attain the height of sixty feet; while at the Straits of Magellan and in Station island, near New Year's harbor, in latitude 55° south, nothing like a tree is found, except scrubby birches and Winterеæ.

Viewing the distribution of plants with respect to longitude, we find that, while the great forms of vegetation are wholly controlled by circumstances attendant upon the parallels of latitude, there are wide differences, of a secondary nature, which correspond in some with the parallels of longitude; and that particular genera and species do not extend beyond the limits of particular districts, to which they give peculiar features. Thus, in North America, on the east of the Rocky Mountains, azaleas, rhododendrons, magnolias, vacciniums, actæas, and oaks, form the principal features of the landscape; while, on the western side of the dividing ridge, these genera almost entirely disappear, and no longer constitute a striking characteristic of the vegetation. The genera of Proteaceæ and the Ericeæ, at the Cape of Good Hope, are replaced in New Holland by different genera of Proteaceæ, and by Epacrideæ; while neither the one nor the other exist on the continent of South America, with the exception of some Rhopalas. The natural order of Bromeliaceæ

* Another confirmation of my opinion that the Phormium tenax, or flax lily of New Zealand, will best succeed in tropical Florida

is exclusively confined to America: Calathea, a genus of Marantaceæ, is only found on the same continent: cinnamon, cloves, and nutmegs are confined to the Indian Archipelago; and hundreds of other instances are to be named of similar exclusive stations. Whether these differences depend upon geological causes, or arise from some other circumstances, is entirely unknown.

Such are the most striking facts connected with the distribution of temperature with respect to vegetation. It will have been seen that little is known of the proportion of humidity in the atmosphere of different climates, and that the amount of light in various latitudes has scarcely been noticed. That the effect of both these agents upon vegetation is most important, cannot be doubted; especially of the latter, upon which the most material vital functions of vegetation mainly depend: but, unfortunately, there are no data from which the precise amount or action of light in different latitudes can be appreciated.

I shall now proceed to state what is known or conjectured of the distribution of the different orders or divisions of vegetables over the surface of the globe. In doing this, I shall merely translate a portion of the very valuable essay of Humboldt upon the subject, as published in the *Dictionnaire des Sciences Naturelles*, vol. xviii. p. 422. in which is comprehended the sum of all that is known of the laws that are observed in the distribution of the various forms of vegetation. "The numerical relations of the forms of vegetation are capable of being investigated in two very different modes. Supposing that the natural families of plants are studied without reference to their geographical distribution, the question will arise as to which type of organization it is after which the greatest number of species have been created. Are there most Glumaceæ, (Cyperaceæ, Gramineæ, and Junceæ, are so called by Humboldt,) or Compositæ in the world? Do these two tribes together constitute a fourth part of phænogamous vegetation? What proportion is borne by Monocotyledones to Dicotyledones? Questions of this kind refer rather to the science of vegetable organization and of mutual affinities. But if, instead of studying natural groups of species in this abstract manner, we view them with reference to the relations they bear to climate or to the distribution over the surface of the globe, other questions of a much more varied nature will arise. Which families, for instance, are more predominant in the torrid zone than in the polar circle? Are Compositæ more numerous in the same parallel of latitude or in the same isothermal line in the old world or the new? Do those forms which are found to diminish in retreating from the equator to the pole follow a similar law of decrement in rising from the plains into the mountains of the equator? Do the proportions borne by one family to another vary on the same isothermal line; and are such proportions the same on either side of the equator? These are, properly speaking, questions of geographical botany: they are connected with the most important problems of meteorology, and of the physics of the globe in general.

"In studying the geographical distribution of particular forms, we can pause either at a consideration of particular species, genera, or natural families. It often happens that a particular species, especially of those kinds which I have called social, covers a vast extent of country: such, for instance, are, in the north, the heaths and forests of pines; such are, in equinoctial America, the assemblages of multitudes of Cactus, Croton, Bambusa, and Brathys, of the same species. It is curious to examine such

instances of multiplication and organic development. We may inquire what species, in a given zone, produces the greatest number of *individuals;* and we may mark the families to which the predominant species belong in different climates.

"In a northern climate, where Compositæ and ferns are to phænogamous plants in the relation of one to thirteen, and of one to twenty-five, (that is to say, when these proportions are found by dividing the total number of phænogamous plants by the number of Compositæ and ferns,) one single species of fern may occupy ten times as much land as all the Compositæ put together. In such a case, ferns would exceed Compositæ by their *mass*, by the number of individuals belonging to particular species of Pteris or Polypodium; but they would not exceed them if a comparison were instituted between the different forms exhibited by the two groups of Compositæ and ferns, and the sum total of phænogamous species. As the multiplication of all species does not follow a single law, and as they do not all produce an equal number of individuals, the *quotients* obtained by dividing the total number of phænoganious plants by the number of species of different families do not by themselves determine the aspect, or, it might almost be said, the nature, of the monotony of vegetation in different quarters of the world. A traveller is often surprised at the continual repetition of individuals of one species, and of the masses of such individuals which are continually occurring; but he has equal reason to wonder at the rarity of other species which are useful to mankind. Thus, in countries where whole forests are formed by Rubiaceæ, (Cinchonaceæ,) Leguminosæ, and Terebinthaceæ, the Cinchonas, logwood, and basalm trees are comparatively very rare.

"In the consideration of species, the subject may also be viewed *in an absolute manner* with reference to the number of species which prevail in particular zones. This interesting kind of comparison has been made in M. De Candolle's grand work, and Mr. Kunth has carried it into effect with more than 3,500 Compositæ now known. It does not, indeed, indicate what families predominate, in a given degree, over other phænogamous plants, either with regard to the number of species, or the mass of individuals; but it determines the numerical relations of species of the same family in different latitudes. The most varied forms of ferns, for instance, are found in the tropics; it is in the mountainous, temperate, humid, and shady regions of those parts of the world, that the family of ferns produces the greatest number of species. In the temperate zone there are fewer than in the tropics, and the total number continues to decrease as we approach the pole: but as a cold country, Lapland, for instance, produces species that have a greater power of resisting low temperature than the great mass of phænogamus plants, it happens that, in Lapland, the relative proportion borne by ferns to the rest of the flora is greater than in France or Germany. The *numerical relations*, which appear in the tables that are now about to be produced, are entirely unlike the relations indicated *by an absolute comparison* of the species that vegetate under different parallels of latitude. The variation which is observable in proceeding from the equator to the poles, is consequently different in those two methods. In that of fractions, which is adopted by Mr. Brown and myself, there are two causes of variation; that is to say, the total numbers of phænogamous plants do not vary in passing from one parallel of latitude, or rather from one is thermal zone

to another, in the same proportions as the number of species of a given family.

"If from *species* or *individuals* of the same form, which re-produce themselves in conformity to certain fixed laws, we pass to those divisions of the natural system, which are *abstractions* of different degrees of importance, we may either confine ourselves to genera, or orders, or sections of a still higher degree. There are certain genera and families which belong exclusively to certain zones, and a particular combination of the conditions of climate; but there is also a great number of genera and families, of which we find representatives under all zones and at all elevations. The earliest researches upon the geographical distribution of forms were those of M. Treviranus, published in his ingenious work on Biology, (vol. ii. pp. 47, 63, 83, 129,) and the object of these was the stations of genera upon the globe. But it is more difficult to obtain general results from such a method than from that which compares the number of species of each family, or the great groups of a particular family, to the whole mass of phænogamous plants. In the frozen zone, the variety of genuine forms does not diminish in anything like the degree of decrement of species; a greater number of genera, in a given number of species, is always to be found in such countries: and so it also is with the summits of high mountains, which are colonised by a great number of genera supplied by the more abundant vegetation of the plains.

"It is very instructive to study the vegetation of the tropics and of the temperate zone, between the parallels of 40° and 50°, in two different ways: firstly, in determining the numerical properties of the flora of a large extent of country, including both mountains and plains; and, secondly, in ascertaining those proportions for the plains only of the temperate and torrid zones. As in our herbaria we have indicated, by barometrical measurement, the elevation of each plant in more than 1,000 cases above the level of the sea in equinoctial America, it will be easy, when the account of the species is completed, (it is now completed.) to separate those which grow at or above an elevation of 6,000 feet from such as are inhabitants of a lower region. This operation will affect most sensibly those families that abound in alpine species; as, for instance, Gramineæ and Compositæ. At 6,000 feet of elevation, the mean temperature of the air, on the back of the equatorial Andes, is 62° 6', which is equal to that of July at Paris. Although, upon the table-land of the Cordilleras, we find the same annual temperature as in high latitudes, yet it is not right to generalise too much such analogies between the temperate climates of equatorial mountains and low stations in the circumpolar zone. These analogies are not so great as is supposed; they are much influenced by the partial distribution of heat in different seasons of the year. The quotient does not regularly change in rising from the plains into the mountains, in the same manner as it does in approaching the pole: as happens with Monocotyledones in general, ferns, and Compositæ.

"We may, moreover, remark, that the development of the vegetation of different families depends neither upon geographical or isothermal latitude alone: but that, on the contrary, the quotients are not in accordance on the same isothermal line of the temperate zone in the plains of America, and of the old world. Under the tropics, there is a remarkable difference between America, India, and the western side of Africa. The distribution of organized beings over the surface of the globe depends not only upon very com-

plicated conditions of climate, but also upon geological causes, the nature of which is wholly unknown, but which are connected with the original state of our planet. In the equinoctial zone of Africa palms are not very numerous, if compared with the much greater number in South America. Differences such as these, far from turning us from a search after the laws of nature, should, on the contrary, excite us to contemplate those laws in their most complicated forms. Lines of equal heat do not follow the parallel of the equator; they have convex and concave summits, which are distributed very regularly over the globe, and form different systems along the eastern and western sides of the two worlds, in the centre of continents, and in the vicinity of oceans. It is probable that, when the globe shall have been more correctly examined, it will be found that the lines of *maxima of grouping* (that is, lines drawn through those points were the fractions are reduced to the smallest denominator) will be isothermal lines. If we divide the globe into lines of longitude, and compare the numerical proportions of those lines under similar isothermal latitudes, the existence of different systems of grouping will at once be evident. From such systems can be distinguished, even in the present imperfect state of our knowledge, those of the new world, of Western Africa, of India, and of New Holland. As we find that, notwithstanding the regular increase of heat from the equator to the poles, the maximum of heat is not always identical in different countries, in different degrees of longitude; so there exists places where certain families attain a greater degree of development than elsewhere; as is the case with Compositæ in the temperate region of North America, and especially **at the southern extremity of Africa.**"

Now follow tables of the different numerical proportions of certain extensive families and divisions of plants, as far as they have been ascertained. I give them in Humboldt's words, with a few interpolations, which are distinguished by being included within crotchets [ ].

"ACOTYLEDONES.

"Cryptogamic plants, (fungi, lichens, mosses, and ferns,) and cellular and vascular Agamæ of De Candolle. Taking the plants of the plains along with those of the mountains, we have found, under the tropics, $\frac{1}{5}$; but their number ought to be much greater. Brown has shown that it is probable that, in the torrid zone, the proportion is $\frac{1}{11}$ for the plains, and $\frac{1}{3}$ for the mountains. In the temperate zone cryptogamous plants are generally to phænogamous as 1 to 2; in the frozen zone they maintain as large a proportion, and often much surpass it. [In Melville island the numbers are 58 crypt. to 67 phænog., or nearly equal: in Sweden, according to the computation of Wahlenberg, they are something less than 4 to 1; and it is probable that this is a near approximation to the true proportions of Sweden, the cryptogamic flora of that country having been more accurately investigated than that of any other part of the world.

"In separating cryptogamous plants into three groups, we observe that ferns are more numerous, the denominator of the fraction being smaller in the frozen than in the temperate zone. Lichens and mosses also increase towards the frozen zone. The geographical distribution of ferns depends upon the combination of local circumstances of shade, humidity, and moderate warmth. The maximum (that is to say, the place where the denominator of the fraction of the group becomes the smallest possible) is found

to be in the mountainous parts of the tropics, especially in small islands, in which the proportion rises to $\frac{1}{3}$, and even higher. Not distinguishing the plains from the mountains, Brown finds the proportion of ferns in the torrid zone to be $\frac{1}{20}$: in Arabia, India, New Holland, and Western Africa (within the tropics) it is $\frac{1}{26}$: our American herbaria only indicate $\frac{1}{33}$: but ferns are rare in the wide valleys and arid table-land of the Andes, where we were constrained to reside a long time. In the temperate zone ferns are $\frac{1}{70}$, in France $\frac{1}{73}$, in Germany, according to recent observations, $\frac{1}{71}$. The group of ferns is extremely rare on Atlas, and is almost entirely absent from Egypt. [In Sicily, Presl finds them $\frac{1}{80}$; in Sweden, according to Wahlenberg, they are about $\frac{1}{110}$.] In the frozen zone ferns appear to increase to $\frac{1}{25}$. [There are none in Melville island.]

"MONOCOTYLEDONES.

"The denominator becomes progressively smaller in going from the equator to 62° north latitude; it again increases in still more northern regions, on the coast of Greenland, where Gramineæ are very rare. [Brown remarks that, in the list of Greenland plants, Dicotyledones are to Monocotyledones as 4 to 1, or in nearly the equinoctial ratio; and in Spitzbergen, as well as can be judged, the proportion of Dicotyledones appears to be still further increased. This inversion was found to depend as much on the reduction of the proportion of Gramineæ as on the increase of certain dicotyledonous families, especially Saxifrageæ and Cruciferæ. The flora of Melville island is, however, very different, Dicotyledones being to Monocotyledones as 5 to 2, or in as low a ratio as has any where been observed; while the proportion of grasses is nearly double that of any part of the world.—*Parry's Appendix.*] The proportion varies from $\frac{1}{5}$ to $\frac{1}{6}$ in different parts of the tropics. Among 3,880 phanerogamous plants found in equinoctial America by Bonpland and myself, there are 654 Monocotyledones and 3,226 Dicotyledones; here, therefore, the great division of Monocotyledones forms $\frac{1}{6}$ of phænogamous plants. According to Brown, this proportion is in the old world (India, equinoctial Africa, and New Holland) $\frac{1}{5}$. Under the temperate zone it is found to be $\frac{1}{4}$; France 1 : $4\frac{2}{5}$; Germany 1 : $4\frac{1}{2}$; North America, according to Pursh, 1 : $4\frac{1}{2}$; kingdom of Naples 1 : $4\frac{1}{5}$; Switzerland 1 : $4\frac{1}{4}$; Great Britain 1 : $3\frac{3}{4}$; [Sweden 1 : $3\frac{9}{10}$; but in Sicily, according to Presl, it is 1 : $5\frac{3}{10}$, which is much too high.] In the frozen zone $\frac{1}{3}$.

"GLUMACEÆ (that is to say, the three families of Junceæ, Cyperaceæ, and Gramineæ united.)—*Trop.* $\frac{1}{11}$; *Temp.* $\frac{1}{8}$; *Frozen* $\frac{1}{4}$. This increase towards the north is due to the greater prevalence of Junceæ and Cyperaceæ, which are much more rare, as compared with other phænogamous plants, in the temperate and torrid zones. Comparing the species of these three families, we find that Gramineæ, Cyperaceæ, and Junceæ, are in the tropics as 25, 7, 1; in the temperate parts of the old world as 7, 5, 1; within the polar circle as $2\frac{2}{5}$, $2\frac{3}{5}$, and 1. In Lapland there are as many Gramineæ as Cyperaceæ; thence, towards the equator, Cyperaceæ and Junceæ diminish much more than Gramineæ. The form of Junceæ almost disappears in the tropics.

"JUNCEÆ alone.—*Trop.* $\frac{1}{400}$: *Temp.* $\frac{1}{90}$, (Germany $\frac{1}{94}$, France $\frac{1}{156}$,) [Sicily $\frac{1}{303}$;] *Frozen* $\frac{1}{25}$, [Melville island $\frac{1}{65}$.]

"CYPERACEÆ alone.—*Trop.* America scarcely $\frac{1}{57}$; Western Africa $\frac{1}{18}$, India $\frac{1}{25}$; New Holland $\frac{1}{14}$; *Temp.* perhaps $\frac{1}{20}$, (Germany $\frac{1}{18}$, France, ac-

cording to De Candolle, $\frac{1}{2}\frac{1}{7}$, Denmark $\frac{1}{1}\frac{1}{5}$,) [Sweden rather more than $\frac{1}{1}\frac{1}{2}$, Sicily $\frac{1}{5}\frac{1}{7}$;] *Frozen* $\frac{1}{9}$, in Lapland and Kamschatka; [Melville island $\frac{1}{1}\frac{1}{7}$.]

"GRAMINEÆ alone.—*Trop.* I have always supposed $\frac{1}{1}\frac{1}{3}$; but Brown finds for Western Africa $\frac{1}{1}\frac{1}{2}$, for India $\frac{1}{1}\frac{1}{2}$; and Horneman makes the proportion of Guinea $\frac{1}{10}$; *Temp.* Germany $\frac{1}{1}\frac{1}{3}$, France $\frac{1}{1}\frac{1}{3}$, [Sweden not quite $\frac{1}{1}\frac{1}{2}$, Sicily $\frac{1}{1}\frac{1}{5}$;] *Frozen* $\frac{1}{1}\frac{1}{0}$, Melville island nearly $\frac{1}{5}$.]

"DICOTYLEDONES.

"COMPOSITÆ.—Not distinguishing plants of the plains from those of the mountains, we found them in equinoctial America $\frac{1}{6}$ and $\frac{1}{7}$: but of 534 compositæ of our herbaria, only 94 were found between the plains and 3,000 feet of elevation, a height at which the mean temperature is 71° 3', equalling that of Cairo, Algiers, and Maderia. From the plains to 6,000 feet, where mean temperature is that of Naples, we found 265 compositæ. Therefore the proportion of compositæ in the regions of equinoctial America, below 6,000 feet, is from $\frac{1}{6}$ to $\frac{1}{1}\frac{1}{6}$. This result is very remarkable, inasmuch as it proves that, within the tropics in the low and hot region of the new continent, there are fewer compositæ; and in the subalpine and temperate regions, more than under the same conditions in the old world. Brown finds for the Congo river and Sierra Leone $\frac{1}{2}\frac{1}{3}$, for India and New Holland $\frac{1}{1}\frac{1}{6}$. In the *temperate* zone compositæ are, in America, $\frac{1}{6}$; and this is probably the proportion borne by compositæ on the very high stations of equinoctial America, to the whole mass of phænogamous plants in the same places; at the Cape of Good Hope $\frac{1}{5}$; in France $\frac{1}{7}$, or more properly, $\frac{2}{1}\frac{1}{5}$, in Germany $\frac{1}{3}$, [in Sweden, between $\frac{1}{1}\frac{1}{6}$ and $\frac{1}{1}\frac{1}{1}$, in Sicily, rather less than $\frac{1}{8}$.] In the *frozen* zone compositæ are, in Lapland $\frac{1}{1}\frac{1}{0}$, in Kamtschatka $\frac{1}{1}\frac{1}{3}$, [in Melville island $\frac{1}{1}\frac{1}{3}$.]

"LEGUMINOSÆ.—*Trop.* America $\frac{1}{1}\frac{1}{2}$, India $\frac{1}{9}$, New Holland $\frac{1}{5}$, Western Africa $\frac{1}{8}$; *Temp.* France $\frac{1}{1}\frac{1}{6}$, Germany $\frac{1}{2}\frac{1}{6}$, North America $\frac{1}{1}\frac{1}{7}$, Siberia $\frac{1}{1}\frac{1}{4}$, [Sweden $\frac{1}{2}\frac{1}{2}$, Sicily $\frac{1}{7}$:] *Frozen* $\frac{1}{3}\frac{1}{3}$. [Melville island $\frac{1}{3}\frac{1}{3}$.]

"LABIATÆ.—*Trop.* $\frac{1}{1}\frac{1}{5}$; *Temp.* North America $\frac{1}{2}\frac{1}{6}$. Germany, $\frac{1}{2}\frac{1}{6}$, France $\frac{1}{2}\frac{1}{4}$, [Sicily $\frac{1}{2}\frac{1}{2}$. Sweden $\frac{1}{3}\frac{1}{1}$;] *Frozen* $\frac{1}{7}\frac{1}{6}$. [Melville island 0.] The scarcity of Labiatæ and Cruciferæ, in the temperate zone of the new continent, is a very remarkable phenomenon.

"MALVACÆ.—*Trop.* America $\frac{1}{4}\frac{1}{7}$, India and Western Africa $\frac{1}{3}\frac{1}{4}$, the coast of Guinea alone $\frac{1}{2}\frac{1}{6}$; *Temp.* $\frac{1}{2}\frac{1}{6}$; *Frozen* 0.

"CRUCIFERÆ.—*Trop.* Scarcely any, except in mountainous regions beyond from 7,000 to 10,000 feet of elevation; France $\frac{1}{1}\frac{1}{5}$, Germany $\frac{1}{1}\frac{1}{1}$, [Sweden $\frac{1}{1}\frac{1}{9}$, Sicily $\frac{1}{1}\frac{1}{1}$, Balearic islands, according to Cambessedes $\frac{1}{2}\frac{1}{1}$, Melville island $\frac{1}{7}$,] North America $\frac{1}{6}\frac{1}{5}$.

RUBIACEÆ.—Without dividing the family into several sections, we find for the *tropics* in America $\frac{1}{2}\frac{1}{9}$, in Western Africa $\frac{1}{1}\frac{1}{4}$; for the *temperate* zone in Germany $\frac{1}{7}\frac{1}{0}$, in France $\frac{1}{7}\frac{1}{3}$; for the *frozen* zone in Lapland $\frac{1}{1}\frac{1}{1}$. Brown separates the great family of Rubiaceæ into two groups, distinguished by peculiar relations to climate. That of Stellatæ without stipulæ, principally belongs to the temperate zone; it is almost wholly absent under the tropics, except on the summit of mountains. The group, with opposite stipulate leaves, (*Cinchonaceæ*, Lindl.) belongs exclusively to equitorial regions.

"EUPHORBIACEÆ.—*Trop.* America $\frac{1}{3}\frac{1}{5}$, India and New Holland $\frac{1}{3}\frac{1}{0}$,

Western Africa $\frac{1}{2}\frac{1}{8}$; *Temp.* France $\frac{1}{7}\frac{1}{0}$, Germany $\frac{1}{1}\frac{1}{0}\frac{1}{0}$, [Sicily $\frac{1}{5}\frac{1}{0}$, Sweden $\frac{1}{0}\frac{1}{0}\frac{1}{0}$; Balearic islands $\frac{1}{4}\frac{1}{3}$;] *Frozen.* Lapland $\frac{1}{5}\frac{1}{0}\frac{1}{0}$.

"ERICEÆ.—*Trop.* America $\frac{1}{1}\frac{1}{3}\frac{1}{0}$; *Temp.* France $\frac{1}{1}\frac{1}{-}$ many $\frac{1}{9}\frac{1}{0}$, North America $\frac{1}{3}\frac{1}{6}$; *Frozen.* Lapland $\frac{1}{2}\frac{1}{0}$.

"AMENTACEÆ.—*Trop.* America $\frac{1}{8}\frac{1}{0}\frac{1}{6}$; *Temp.* France $\frac{1}{5}\frac{1}{6}$, Germany $\frac{1}{4}\frac{1}{0}$, North America $\frac{1}{2}\frac{1}{5}$; *Frozen.* Lapland $\frac{1}{2}\frac{1}{0}$.

"UMBELLIFERÆ.—Scarcely any in the *tropics* below 7,000 feet, but taking together, in equinoctial America, both the plains and the high mountains, $\frac{1}{1}\frac{1}{0}\frac{1}{5}$; in the *Temp.* zone, much more in the old than in the new world; France $\frac{1}{3}\frac{1}{4}$, North America $\frac{1}{5}\frac{1}{7}$; *Frozen.* Lapland $\frac{1}{5}\frac{1}{0}$.

"In comparing the two worlds, we find in general in the new continent, under the equator, fewer Cyperaceæ and Cinchonaceæ, and more Compositæ; in the temperate zone, fewer Labiatæ and Cruciferæ, and more Compositæ, Ericeæ, and Amentaceæ, than in the corresponding zones of the old world. The families that increase from the equator towards the poles, (according to the method of fractions,) are Glumaceæ, Ericeæ, and Amentaceæ; those which diminish from the equator to the pole, are Leguminosæ, Rubiaceæ, Euphorbiaceæ, and Malvaceæ; the families that appear to attain their maximum in the temperate zone, are Compositæ, Labiatæ, Umbelliferæ, and Cruciferæ."

To these most instructive and interesting remarks, Humboldt has added the following table:

Groups.	Proportion to the whole mass of phænogamous plants.			Direction of increase.
	Equatorial zone, Lat. 0°—10°.	Temperate zone. Lat. 45°—52°.	Frozen zone, Lat. 67°—70°.	
Agamæ, *(ferns, lichens, mosses, fungi)*	Plains, 1-15 - - - / Mountains, 1-5 - - -	$\frac{1}{2}$	1-1	PD.
Ferns *alone* - - - -	Countries nearly flat, 1-20 - / Countries very mount'nous, $\frac{1}{2}$ to $\frac{1}{3}$	1-70	1-25	TEP.
Monocotyledones - - -	Old continent, 1-5 - - / New continent, 1-6 - -	$\frac{1}{4}$	$\frac{1}{5}$	PD.
Glumaceæ, *(juncea, cyperacæ, gramineæ)*	1-11 - -	$\frac{1}{6}$	$\frac{1}{4}$	PD.
Junceæ *alone* - - - -	1-400 - -	1-90	1-25	PD.
Cyperaceæ *alone* - - -	Old continent, 1-23 - - / New continent, 1-50 - -	1-20	1-9	PD.
Gramineæ *alone* - - -	1 14 - -	1-12	1-10	PD.
Compositæ - - - -	Old continent, 1-18 - - / New continent, 1-12 - -	Old continent, $\frac{1}{2}$ - / New continent, 1-6 -	1-13	PET.
Leguminosæ - - - -	1-10 - -	1-18 -	1-35	ED.
Rubiaceæ - - - -	Old continent, 1-14 - - / New continent, 1-25 - -	1-60 -	1-80	ED
Euphorbiaceæ - - -	1-32 - -	1-80 -	1-500	ED.
Labiatæ - - - -	1-40 - -	America, 1-40 - / Europe, 1-25 -	1-70	PET.
Malvaceæ - - - -	1-35 - -	1-200 -	0	ED.
Ericeæ - - - -	1-130 - -	Europe, 1-100 - / America, 1-36 -	1-25	PD.
Amentaceæ - - - -	1-800 - -	Europe, 1-45 - / America, 1-25 -	1-20	PD.
Umbelliferæ - - - -	1 500 - -	1-40 -	1-60	PET.
Cruciferæ - - - -	1-800 - -	Europe, 1-18 - / America, 1-60 -	1-24	PET.

EXPLANATION OF THE SIGNS.—PD., the denominator of the fraction diminishes from the equator towards the north pole; ED., the denominator diminishes towards the equator; PET., the denominator diminishes from the north pole and the equator towards the temperate zone; TEP., the denominator diminishes towards the equator and the north pole.

From what has now been said, it would seem that the *forms* assumed by *vegetation*, in different latitudes, are dependant upon *particular conditions of climate and soil*, and that it is to variations of these conditions that we are to ascribe the difference between the flora of the equator and of the polar regions. And this is no doubt true: but there are, nevertheless, *some plants* which have a *remarkable power of adapting themselves* to all *climates* and circumstances; and there are others which readily *naturalize themselves* in *climates similar to their own*. Of the latter, examples present themselves at every step: all the *hardy plants of our gardens* may, in some sort, be considered of this nature; for, although they do not grow spontaneously in the fields, they *flourish almost without care in our gardens*. The pine-apple has *gradually extended* itself eastward from America, *through Africa, into the Indian Archipelago*: where it is now as *common as if it were a plant indigenous to the soil*; and, in like manner, the *spices* of the Indies have become *naturalized* on the the coast of Africa, and in the *West Indian islands*.* Of the former description, the instances are not numerous, but they are very remarkable. In the woods of Georgia, in North America, grows the Rosa lævigata, which, while all the other species of rose of that country are entirely different from those of other regions, is identical with the R. sinica of China; to the flora of which country, that of North America has no resemblance. Samolus valeraudi is found all over the world, from the frozen north to the burning south; associated here with Amentaceæ and similar northern forms, and there mixed with palms and the genuine denizens of the tropics. Above 350 species are said to be common to Europe and North America, and even among the peculiar features of the flora of New Holland, Brown recognised 166 European species. Royle has added numerous instances of Siberian, European, African, and American plants occurring in India. The presence of many of such strangers may, undoubtedly, be referred to the agency of man, by whom they have been transported from climate to climate, along with corn, and by other means; as, for example, at Pont Juvenal, near Montpellier, the vicinity of which abounds with Barbary plants; the seeds of which are known to have been brought across the Mediterranean along with the Barbary wool which is disembarked at that station. In like manner, the various kinds of corn have been carried about from country to country, for the service of mankind, until their real home has become doubtful. *Medicago sativa* is common in Chili, whither it has been transported by the Spaniards; and instances, in abundance, of similar cases could be produced. But it must not thence be inferred that all cases of species, growing in places far away from their kindred forms, are to be referred to migration: for this, the agency of man, of animals, of *seas*, of *wind*, and of *torrents*, will, doubtless, have done a great deal; but none of

* In the hot-houses and green-houses of Europe there are thousands of valuable plants of the tropics which have hitherto been merely costly objects of princely curiosity; but of which very many may be profitably transported to tropical Florida. It is well known that all the coffee of tropical America has proceeded from a single plant in the garden at Paris, transplanted in the island of Guadaloupe; and there is, or ought to be, now on the way from the same garden, by the orders of the subscriber, a plant which will be of infinitely more importance to the United States, when domesticated in the marshes of Florida, viz: the Musa Abaca. In the European colonies, in the United States islands, and on the continent of tropical America, there are botanical gardens and nurseries which contain many of the most valuable vegetables of the whole torrid zone. Hence the Government of the United States, at a small expense, can procure them from Cuba and Jamaica, and Guadaloupe, and from the English, French, and Dutch settlements at Cayenne, Demarara, and also from Brazil. H P.

these causes, nor any other with which I am acquainted, will explain the identity of the Calypso borealis. Orchis viridis, and Betula nana, of North America, and of Europe; of the Potamogetons, common to Europe and New Holland: of the Rose, already adverted to, as common to North America and China; of the Osmorhiza of the Himalayas, with that of the United States; of the wide diffusion of Samolus valerandi; and, most especially, of the identity of the cryptogamic plants of various countries, plants incapable of cultivation—unconnected with the purposes of man—and, of all others, the most difficult of transport under any form. To us it appears that such plants must have been originally created in the places where they now exist; the contingent circumstances under which they were found having been favorable to the particular mode of vegetable development which was necessary for their formation.

One rather important element in all calculations concerning the geographical distribution of plants, is the actual number of species upon the surface of the earth. In the existing state of herbaria, and with so many large districts, either altogether, or very imperfectly examined, there is no possibility of arriving at anything more than an approximation to the true number; and even this may prove so very wide of the truth as to be really exceedingly fallacious. Nevertheless, some idea of it may be formed from the following data and conjectures:

	Phænogamous.	Cryptogamous.
The number of described plants in 1827, was, according to Sprengel, about	31,000	6,000
To this may be added for errors, and erroneous suppressions of species, say	6,000	1,000
Add also for India and the rest of Asia	10,000	
" America	20,000	2,000
" Africa	10,000	
	77,000	9,000

That this is not an exaggerated statement in regard America, will be obvious from the following comparison of the numbers, in a few cases, of American species, admitted by Sprengel, and what have since been published by other botanists:

Number of American species of					
Salvia	99	according to Sprengel,	166	according to Bentham.	
Hyptis	29	"	"	208	" "
Hydrophylleæ	12	"	"	40	" "
Californian Polemoniaceæ	4	"	"	33	" "
Habenaria *R. Br.*	31	"	"	66	according to Lindley.
Melastomaceæ	235	"	"	633	according to De Candolle.
	410			1,146	

So that the number appears already to have been ascertained to be in these seven cases, nearly three times as great as Sprengel supposed.

The best attempt that has yet been made to group these species geographically, is by Schouw, from whom we take (Linn. vol. viii. p. 623) the following:

Notes for a lecture on the geographical distribution of plants.

I. KINGDOM OF THE MOSSES AND SAXIFRAGEÆ.

(Arctic Alpine Kingdom.— *Wahlenberg's Kingdom.*)

a. The Polar countries from the ice limits to the tree limits (Scandinavia, 70° N. L. Asia, 68°, Kamtschatka, 55°, middle of North America, 68°, Labrador, 58°, the polar islands, Greenland, Iceland, 60°.

b. The higher regions of the mountains of Europe, North Asia, and probably also of North America. Likewise from the snow-line to the tree-limit, namely: in Northern Scandinavia, 1,500—3,000 French feet; in Southern Scandinavia, 3,500—5,200; in the Carpathian Alps, 4,500—8,000; in the Alps on their north side, 5,500—8,200, on the south side, 6,500—8,600; the Pyrenees on the north side, 6,500—7,800, on the south side, 6,900—8,600; the Appenines, 6,000—9,000; Caucasus, 5,500—10,000; the Altai Mountains, 6,000—7,000. The Greek Mountains, the Balkan, Sierra Nevada.

Mean Temperature: Polar lands, 1.75° to +11° *Fahr.*; Mount. reg. +20.75° to +36.5°.

Characteristic and predominating forms.—Ranunculus, Arabis, Draba, Arenaria, Dryas, Potentilla, Saxifraga, Rhododendron, Azalea, Gentiana, Pedicularis, Salix, Musci, Lichenes. For the polar lands particularly: Coptis, Eutrema, Parrya, Diapensia, Andromeda, Lædum. For the mountain regions: Cherleria, Campanula, Phyteuma, Primula, Aretia, Soldanella.

Dwarf herbaceous plants with proportionate large flowers of a pure color. Trees absent. Dominating shrubs and half-shrubs in the polar lands: Betula nana; Salix lanata, fusca, lapponum, reticulata, arctica, herbacea; Rubus, Chamæmorus, Empetrum nigrum; Andromeda hypnoides, tetragona; Arbutus alpina, Uva ursi; Azalea procumbens, Rhododendron lapponicum, Menziesia cærulea. In the mountain region: Juniperus nana, Alnus viridis; Salix reticulata, herbacea; Rhododendron ferrugineum, hirsutum, caucasicum; Vaccinium Myrtillus, uliginosum; Azalea procumbens; Arbutus alpina, Uva ursi; Empetrum nigrum.

Plants which approach the snow line: Ranunculus glacialis, Saxifraga oppositifolia, Silene acaulis. In the polar lands particularly: Agrostis algida; Ranunculus hyperboreus, nivalis; Papaver nudicaule, Draba alpina, Lychnis apetala, Diapensia lapponica. In the mountain regions: Saxifraga muscoides, bryoides; Cherleria sedoides; Aretia helvetica, alpina; Draba nivalis, Petrocallis pyrenaica, Arabis bellidifolia, Myosotis nana, Gentiana nivalis, Achillea nana, Linaria alpina.

No cultivation.

II. KINGDOM OF THE UMBELLIFERÆ AND CRUCIFERÆ.

(North European and North Asiatic Kingdom.— *Linné's Kingdom.*)

Europe and North Asia from the southern limits of the last kingdom to the Pyrenees, the Alps, the Balkan, Caucasus, Altai, Dahuria, and the middle regions of the mountains of Southern Europe. *Mean Temperature,* +27.5° to 56.75°.

Character.—Umbelliferæ, Cruciferæ, Coniferæ, Amentaceæ, Gramineæ,

Cariceæ, Fungi, Cichoraceæ, Cynarocephalæ: particularly in Asia ; Halophytæ (*e. g.* Salsola, Salicornia,) Astragaleæ.

Luxuriant growth of grass. Trees with deciduous leaves. Some heaths.

Predominating trees and shrubs: Pinus sylvestris, Cembra, sibirica, Pinaster ; Abies excelsa, pectinata ; Larix europæa, Juniperus communis, Betula alba, Alnus glutinosa and incana ; Fagus sylvatica, Quercus pedunculata and sessiliflora, Carpinus Betulus, Castanea vesca, Salices, Populus tremula, Corylus Avellana, Ulmus campestris, Erica vulgaris, Prunus spinosa, Sorbus aucuparia ; Acer Pseudo-platanus, platanoides, campestre ; Tilia platyphilla, microphylla.

Cultivated plants: Secale sereale ; Hordeum vulgare, hexastichon, distichon ; Avena Sativa ; Triticum vulgare, Spelta ; Zea Mays, Panicum miliaceum, Solanom tuberosum, Polygonum Fagopyrum.

Pyrus Malus, communis ; Cydonia vulgaris, Cerasus vulgaris and avium, Prunus domestica, Armeniaca vulgaris, Persica vulgaris, Morus nigra, Juglans regia, Vitis vinifera ; Ribes rubrum, Grossularia, nigrum ; Fragaria vesca, Cucumis Melo.

Brassica oleracea, Rapa ; Raphanus sativus, Sinapis nigra and alba, Pisum sativum, Phaseolus vulgaris, Faba vulgaris, Ervum Lens, Spinacia oleracea, Beta vulgaris, Cucumis sativus, Cucurbita Pepo, Carum Carvi, Daucus Carota, Humulus Lupulus, Linum usitatissimum, Cannabis sativa Brassica Napus.

Trifolium pratense and repens, Vicia sativa, Medicago sativa, Lolium perenne.

III. KINGDOM OF LABIATÆ AND CARYOPHYLLEÆ.

(Mediterranean Kingdom.—*De Candolle's Kingdom.*)

The region which border the Mediterranean Sea, limited on the north by the Pyrenees, the Alps, the Balkan, and Caucasus ; on the south, by Atlas and the deserts of North Africa ; on the east by Taurus. *Mean Temperature*, +54.5° to 72.5°.

Character.—Labiatæ, Caryophylleæ, Borragineæ, Cistineæ, Liliaceæ. The orders mentioned under II.; but the most of them less predominating. particularly Cariceæ. Representations of tropical orders: Palmæ, Terebinthaceæ, Laurineæ. Orders which increase towards the equator are more numerous than in II., as Leguminosæ, Malvaceæ, Solaneæ, Euphorbiaceæ, Urticeæ.

Adonis, Nigella, Trifolium, Medicago, Genista, Cytisus, Scabiosa, Anthemis, Achillea, Verbascum, Narcissus. Many evergreen trees and shrubs. A greater number of ligneous plants than in II. The growth of grass less luxuriant.

Predominating trees and shrubs: Pinus Pinea, Pinaster, halepensis, Laricio ; Cupressus sempervirens ; Juniperus phœnicea, macrocarpa ; Quercus Cerris, pedunculata, sessiliflora, Ilex, Suber, Ægilops, coccifera, infectoria ; Castanea vesca, Platanus orientalis, Alnus cordifolia, Corylus Colurna, Ostraya vulgarus ; Acer monspessulanum, neapolitanum ; Pistacia, Terebinthus, Lentiscus ; Ceratonia Siliqua, Cercis Siliquastrum, Genista scoparia, Mespilus Pyracantha, Prunus Laurocerasus ; Tamarix gallica, africana ; Myrtus communis, Punica, Granatum, Opuntia vulgarus, (Cactus.) Viburnum Tinus,

Arbutus Unedo, Erica arborea, and scoparia; Rhododendron ponticum, maximum; Cistus sp.; Phillyrea latifolia, angustifolia; Ornus europæa, and rotundifolia, Nerium Oleander, Rosmarinus officinalis, Ephedra distachya, Chamærops humilis, Ruscus aculeatus, Smilax aspera, Tamus communis, Agave americana.

Cultivated plants, the same as under II.; but the following are either scarce, or only to be found on mountains: Secale cereale; Ribes rubrum, Grossularia, nigrum; Polygonum Fagopyrum, Humulus Lupulus; Salanum tuberonum; Pynismalis ammunis.

The following are to be added: Oryza sativa, Sorghum vulgare, Panicum italicum, Ficus Carica, Amygdalus communis, Pistacia vera; Citrus Limonum, Medica, vulgarus, Aurantium; Opuntia vulgaris, Cucurbita Citrullus, Olea europæa; Solanum Melongena, Lycopersicum; Pimpinella Anisum, Coriandrum sativum, Gossypium herbaceum, Morus alba, Crocus sativus, Rhus Coriaria. Lupinus albus, Onobrychis sativa.

Note 1. Madeira, the Azores, and the Canary islands belong to this kingdom; but their Flora approaches to that of tropical Africa. Characteristic forms are: Sempervivum arboreum, Canariense, tortuosum, ect.; Ilex Perado, Plocama pendula, Cacalia Kleinia, Sonchus fruticosus, Arbutus callicarpa, Ardisia excelsa, ceropegia aphylla, Echium giganteum, etc., Laurus fœtens; Euphorbia balsamifera, canariensis; Myrica Faya, Pinus canariensis.

Note 2. The highest regions of this kingdom belong to I., and the middle to II.

IV. KINGDOM OF ASTEREÆ AND SOLIDAGINEÆ.

(North Northern-American Kingdom. *Michaux's Kingdom.*)

North America, from the southern limits of the first kingdom to 36° N. L. *Mean Temperature*, 9.5° to 59°.

Character.—More sorts of Coniferæ and Amentaceæ than in II.; but few Umbelliferæ, Cruciferæ, Cichoraceæ, Cynarocephalæ.

Hydrastis, Sanguinaria, Hudsonia, Ptelea, Robinia, Gymnocladus, Purshia, Gillinia, Decodon, Œnothera, Clarkia, Ludwigia, Bartonia, Claytonia, Heuchera, Ilex, Hamamelis, Mitchella, Aster, Solidago, Liatris, Rudbeckia, Galardia, Vaccinium, Andromeda, Kalmia, Sabbatia, Houstonia, Hydrophyllum, Phlox, Monarda, Dodecatheon, Dirca, Hamiltonia, Lewisia, Trilium. Medeola.

Predominant trees and shrubs: Pinus Strobus, inops, resinosa, Banksiana, variabilis, rigida, serotina, pungens; Abies balsamea, taxifolia, canadensis, nigra, rubra, alba; Larix pendula, microcarpa; Thuja occidentalis, sphæroidea; Juniperus virginiana, Sabina; Taxus canadensis, Quercus 25 sp.; Fagus sylvatica, ferruginea; Castanea americana, pumila; Ostrya virginica, Carpinus americana; Corylus americana, rostrata; Alnus glutinosa, crispa, serrulata; Betula nigra, papyracea, etc.; Salix 27 sp.; Populus balsamifera, monilifera, etc.; Myrica cerifera, etc.; Platanus occidentalis, Liquidambar styraciflua; Juglans nigra, cinerea, etc.; Ulmus americana, ect.; Nyssa aquatica, Fraxinus alba, nigra, etc.; Ornus americana, Ribes floridum, aureum, etc.; Vaccinium 20, Andromeda 10; Kalmia latifolia, angustifolia, glauca; Azalea viscosa, nitida, glauca, nudiflora, etc.; Rhodendron maximum: Cornus florida, alba, canadensis, etc.: Hamamelis

virginica; Spiræa salicifolia, chamædrifolia, opulifolia, hypericifolia, etc.; Gillenia trifoliata, Cratægus sp.; Cerasus pumila, nigra, etc.; Purshia tridentata, Rubus 20, Pyrus sp.: Robinia Pseudacacia, hispida; Gymnocladus canadensis; Rhus typhina, glabra, venenata, Toxicodendron, etc.; Ptelea trifoliata, Ceanothus americanus, etc.; Rhamnus alnifolius, etc.; Ilex opaca, etc.; Euonymus americanus, atropurpureus; Staphylea trifolia, Ampelopsis hederacea; Acer rubrum, dasycarpum, saccharinum, striatum; Negundo fraxinifolium; Xanthoxylum fraxineum, tricarpum; Tilia glabra, pubescens; Liriodendron Tulipifera.

In the northern parts (to 50°, to 55° N. L.) there is no cultivation. More to the south, the same cultivated plants as in II. Maize culture is more frequent.

V. KINGDOM OF MAGNOLIAS.

(Southern North-American Kingdom. *Pursh's Kingdom.*)

North America, between 36°, 30° N. L. *Mean Temperature* 59° to 72.5°.

Character.—Some approximation to tropical vegetation.* Canneæ (Canna, Thalia.) Palmæ (Chamærops,) Yucca, Cycadeæ (Zamia,) Laurus, Ipomœa, Bignonia, Asclepias, Cacteæ (Mammillaria, Opuntia,) Rhexia, Passiflora, Cassia, Sapindus.

A few Labiatæ, Caryophylleæ, Umbelliferæ, Cruciferæ, Cichoraceæ, Geraniaceæ; few sorts of Aster and Solidago.

Trees with broad shining leaves and large flowers.

Magnolia, Liriodendron, Illicium, Asimina, Dionæa, Pavia, Amorpha, Gleditshia, Baptisia, Petalostemum, Calycanthus, Œnothera, Claytonia, Rudbeckia, Liatris, Silphium, Kalmia, Houstonia, Frasera, Halesia, Dodecatheon.

Predominating trees and shrubs: Magnolia grandiflora, glauca, etc.; Illicium floridanum and parviflorum, Liriodendron Tulipifera, Asimina sp.; Pavia flava, macrostachya, etc.; Amorpha fruticosa, Gleditschia triacanthos, etc.; Robinia viscosa; Cassia Tora, marilandica etc.: Acacia glandulosa. Calycanthus floridus, etc.; Kalmia hirsuto, cuneata; Opuntia vulgaris, fragilis, missouriensis; Halesia tetraptera, diptera; Laurus Catesbyana, carolinensis, Benzoin, Sassafras, etc.; Juglans fraxinifolia; Carya aquatica, myristicæformis; Liquidambar styraciflua. Carpinus americana; Castanea americana, pumila: Platanus occidentalis, Quercus 25, Schubertia disticha; Pinus Tæda, palustris: Zamia integrifolia; Yucca gloriosa, aloifolia, etc.; Chamærops Hystrix, Palmetto, serrulata.

Culture.—Nearly the same things as in III., with the exception of the olive; the culture of rice is more extended. In the southern parts some tropical plants, particularly Saccharum officinarum.†

* Hence the great encouragement for the gradual accumulation of all tropical plants in the southern and southwestern States. H. P.

† Tropical cotton, the greatest staple; tropical tobacco, the next; then tropical rice; and finally, tropical sugar. H. P.

VI. KINGDOM OF CAMMELLIAS AND CELASTRINEÆ.

(Chino-Japanese Kingdom.—*Kæmpfer's Kingdom.*)

Japan and Northern China 30°—40°. N. L. *Mean Temperature*, 54·5 to 68°.*

Character.—Magnolia, Nandina, Eurya, Camellia, Thea, Celastrus, Ilex, Euonymus, Bumalda, Hovenia, Kerria, Spiræa, Gonocarpus, Lagerstrœmia,† Aucuba, Bladhia, Doræna, Eleagnus, Polygcum, Pollia.

Predominating trees and shrubs: Rhapis flabelliformis, Pinus sp.; Taxus nucifera, verticillata; Cupressus japonica, pendula; Juniperus virginiana: Thuja orientalis, dolabrata; Quercus glabra, glauca; Alnus japonica, Juglans nigra, Broussonetio papyrifera, Daphne odora: Laurus glauca, lucida, umbellata, pedunculata; Olea fragrans, Diospyros Kaki, Mespilus japonica, Sophora japonica; Acer japonicum, septemlobatum, palmatum, etc.; Camellia japonica and Sasanqua.

Cultivated plants: Oryza sativa, Triticum vulgare, Hordeum vulgare, Avena sativa, Sorghum vulgare, Eleusine coracana, Polygonum Fagopyrum, Cycas revoluta, (Sago,) Caladium esculentum, Convolvulus edulis.

Pyrus Malus, communis, baccata, spectabilis; Cydonia vulgaris, Prunus domestica, Cerasus vulgaris; Armeniaca vulgaris, Persica vulgaris, Mespilus japonica; Citrus japonica, decumana, Aurantium, nobilis, marginata, etc.; Cucumis Melo, Thea chinensis; Brassica Rapa, orientalis; Raphanus sativus, Cucumis sativus Conomon; Cucurbita Pepo, Citrullus; Pimpinella Anisum, Illicium anisatum, Soya hispida; Phaseolus vulgaris, radiatus: Pisum sativum, Faba vulgaris, Solanum æthiopicum, Sesamum orientale, Cannabis, sativa, Broussonetia papyrifera, Gossypium herbaceum.

VII. KINGDOM OF SCITAMINEÆ.

(Indian Kingdom.—*Roxburgh's Kingdom.*)

Both the Indian peninsulas to a height of 4—5,000 feet in Ceylon. *Mean Temperature*, 65.75° to 81.5°.‡

Character.—Tropical orders appear, or become more numerous. Palmæ, Cycadeæ, Scitamineæ, Aroideæ, Artocarpeæ, Urticeæ, Euphorbiaceæ, Laurineæ, Convolvulaceæ, Bignoniaceæ, Apocyneæ, Rubiaceæ, Leguminosæ, Terebinthaceæ, Meliaceæ, Guttiferæ, Sapindaceæ, Buttneriaceæ, Malvaceæ.

The following disappear or appear, but sparingly, as Cariceæ, Coniferæ, Amentaceæ, Labiatæ, Borragineæ, Synantherеæ, Rosaceæ, Caryophylleæ, Cistineæ, Cruciferæ, Ranunculaceæ.

Uvaria, Grewia, Eriolæna, Garcinia, Buchanania, Crotalaria, Flemingia, Butea, Carpopogon, Jambosa, Gratiola, Tectona, Holmskioldia, Ficus, Phytocrene, Calamus.

Trees do not lose their leaves. The number of tree like shrubs is more considerable than beyond the tropic. Large magnificent flowers. Many climbing and parasitical plants.§

* Compare this with the mean temperature of Charleston, S. C., and other portions of the southern States, where every useful plant of China and Japan may be successfully propagated.

† At Charleston the tea plant ripens its seeds, and the beautiful lagerstrœmia is thoroughly domesticated.

‡ Annual mean 76.62° in tropical Florida. Lowest extreme, 44°; highest do. 90°.

§ Equally the facts in tropical Florida. H. P

Predominating tree-like plants: Dillenia ornata, scabrella; Uvaria sp., Michelia Campaca etc., Bombax insignis etc., Sterculia sp., Astrapæa Wallichii, Elæocarpus sp., Calophyllum sp., Garcinia sp., Sapindus sp., Swietenia febrifuga, Cissus sp., Aquilaria mallaccensis, Semecarpus Anacardium, Melanorrhœa usitata, Mimosa sp., Acacia sp., Amherstia nobilis, Pterocarpus santalinum, Cassia fistula, Jambosa sp., Gardenia sp., Nauclea sp., Uncaria Gambir, Diospyros Ebenum etc., Urceola elastica, Bignonia, sp., Avicennia tomentosa; Tectona grandis, Hamiltoniana; Laurus Cassia, Cinnamomum, Malabatrum; Tetranthera sp., Myristica sp., Hernandia sonora; Ficus religiosa, indica, elastica, benjamina, and many others; Cycas revoluta, Borassus flabelliformis, Cocos nucifera, Elate sylvestris, Metroxylon Sagus; Calamus Rotang, rudentum, Musa regia; rosacea; coccinea; Abaca nepalensis, troglodytarum, superba, glauca, ornata. Draco, etc.; Areca Catechu, Taliera bengalensis, Dracæna Draco, Pandanus odoratissimus, Flagellaria indica, Bambusa arundinacea.

Cultivated plants: Oryza sativa, Panicum frumentaceum, Eleusine coracana; Sorghum sp.; Cycas circinalis; Dioscorea alata, Arachis hypogæ, Cocos, nucifera, Tamarindus indica, Mangifera indica, Garcinia Mangostana; Musa paradisiaca, sapientum; Jambosa vulgaris, malaccensis; Psidium pomiferum; Citrus Aurantium, decumana, etc.; Cucurbita Citrullus, Saccharum officinarum, Coffea arabica, Caroyphyllus aromaticus; Piper longum, nigrum, Betle, Cubeba; Zingiber officinale; Alpinia Cardamomum, Curcuma longa., Soja hispida, Phaseolus sp., Dolichos sp., Gossypium herbaceum; Indigofera tinctoria, Anil.

VIII. HIMALAYAN KINGDOM.

(*Wallich's Kingdom.*)

The highlands of India, or the mountain terraces, lying on the south of the Himalayan range, Kamoon, Nepal, Boutan, 4,000—10,000 feet. *Mean Temperature*, 36.5° to 65.75°*

Character—Tropical forms disappear or decrease. Palmæ, Cycadeæ, Scitamineæ, Euphorbiaceæ, Solaneæ, Convolvulaceæ, Apocyneæ, Terebinthaceæ, Leguminosæ, Malvaceæ, Annonaceæ.

Extra-tropical, particularly European, forms appear, or become more frequent than in VII., as Cariceæ, Amentaceæ, Conifereæ, Polygoneæ, (Rumex, Polygonum, Rheum,) Primulaceæ, (Primula, Lysimachia,) Labiatæ, Ericeæ, (Rhododendron, Andromeda,) Cichoraceæ, Umbelliferæ, Rosaceæ, (Potentilla, Rubus, Rosa, Mespilus, Pyrus, Prunus,) Acerineæ, Caroyphylleæ, (Stellaria, Cerastium, Arenaria,) Cruciferæ, Ranunculaceæ, (Aconitum, Ranunculus, Thalictrum.)

Orchideæ and Fillices, very numerous. To the characteristic forms also belong Allium, Paris, Plantago, Veronica, Rhinathus, Pedicularis, Didymocarpeæ, Gentiana, Swertia, Campanula, Valeriana, Galium, Cornus, Viburnum.

The most important trees and shrubs: Pinus excelsa; Abies Smithiana, Brunoniana; Cupressus torulosa, Podocarpus latifolia; Juniperus squamata, recurva; Quercus spicata etc., Corylus ferox; Betula utilis, nitida, almoides; Alnus nepalensis; Salix disperma, cuspidata, japonica; Daphne cannabina, Gardeneri, sericea, Bholua; Eleagnus arborea, conferta, umbellata; Hippophea salicifolia, Fraxinus floribunda; Ligustrum nepalense, bracteolactum;

*Mean temperature at New Orleans, 45.16° to 82.83°, or 66.93°.

Xylosteum ligustrinum; Caprifolium japonicum, macranthum; Cornus oblonga, capitata; Viburnum fœtidum, etc.; Andromeda formosa, ovalifolia, etc.; Rhododendrum arboreum, etc., Hedera Helix, etc.; Ilex dipyrena, odorata, etc.; Ribes Takare. Rosa macrophylla, etc.; Rubus rugosus, betullinus, etc.; Spiriæa canescens, etc.; Nellia thyrisflora, rubiflora; Pyrus, Pashia; Mespilus affinis, cuila, etc.; Prunus undulata, cerasoides; Rhus-juglandifolium, fraxinifolium, etc.; Rhamnus sp., Celastrus sp., Euonymus sp.; Acer acuminatum, oblongum; Dobinæ vulgaris; Berberis asiatica Wallichiana, miccia.

Cultivated plants: the corn and fruit of Europe; in the lower par some tropical kinds, as mountain rice.

1. The highest regions of the Himalaya form perhaps a kingdom by itself, or but a province of the Arctic Alpine kingdom; Alpine forms are prevalent.

2 The remaining high mountains and elevated plains of Central Asia are in regard to their vegetation unknown to us.

3. Cochin China and the south of China are not sufficiently examined. The forms of this district show the passage of the Japanese Flora to the Indian. These countries form either provinces of the two latter kingdoms, or make one by themselves.

IX. POLYNESIAN KINGDOM.

(*Reinwardt's Kingdom.*)

The islands between Hindostan and New Holland to a height of 5,000 feet above the level of the sea. *Mean Temperature*, +65.75° to 83.75°.

Character.—Similar to the Indian kingdom. The principal distinction consists in a greater number of Orchideæ, (particularly epiphytal, which appear under many peculiar forms,) Fillices, and many sorts of figs. A slight approximation to the New Holland forms in Melaleuca, Metrosideros, Proteaceæ, (Heliophyllum.) Further characteristic forms are: Licuala, Lodoicea, Rafflesia, Brugmansia, Stemanurus, Antiaris, Myristica, Nomaphila, Hydrophytum, Philagonia, Esenbeckia, Echinocarpus, Aromadendron.

Predominating trees and shrubs: Primitive woods particularly of Ficus, Laurineæ, Calameæ, Bignoniaceæ, Licuala speciosa, Lodoice, Sechellarum, Broussonetia papyrifera, Artocarpus incisa, Antiaris toxicaria, (Bohn Upas,) Myristica sp., Ardisa sp., Tectona grandis, Strychnos, Tieute, Diospyros sp., Barringtonia speciosa, excelsa; Philagonia procera, Cissus sp., Calophyllum Inophyllum Elæocarpus sp., Esenbeckia altissima, Echinocarpus Sigun.

Cultivated plants: The same as in the Indian kingdom, along with Artocarpus incisa, Janipha Manihot, Inocarpus edulis, Myristica moschata, Laurus Camphora, Carica Papaya; Gossypium arboreum, vitifolium; Broussonetia papyrifera, Cannabis sativa.

X. HIGHLAND JAVANESE KINGDOM.

(*Blume's Kingdom.*)

The higher regions (above 5,000 feet) of Java, probably also of the neighboring islands. *Mean Temperature*, ...

Character.—This kingdom is very much like the Himalayan, and probably forms with it but one. Extra tropical forms are in lieu of tropical. Oak-woods in lieu of fig-woods. Plantago, Lysimachia, Veronica, Gentiana, Swertia, Vaccinium, Gaultheria, Vireya, Thibaudia, Bellis, Galium, Saprosma.

Characteristic trees: Podocarpus amara, imbricata, latifolia, bracteata; Agathis loranthifolia, Quercus sp. 16, Myrica javanica; Castanea javanica, argentea, etc.; Lithocarpus javensis; Engelhardtia spicata, rigida; Viburnum sp., Sambucus javanica, Hæmospermum arboreum, Mespilus sp.

XI. OCEANIC KINGDOM.

(*Chamisso's Kingdom.*)

All the islands of the South Sea within the tropic. *Mean Temperature*, 72.5° to 81.5° Tropical Florida 69.72° to 82.76°.

Character.—A poor flora, with few peculiarities. More approximation to the flora of Asia than to that of Africa: some relation with that of New Holland. (Casuarina, Proteaceæ, Myoporum, Epacrideæ, Melaleuca, Acaciæ aphyllæ.) Schiedea, Antholoma, Aporetica, Crossostylis, Codia, Timonius, Kadua, Cyathostegia, Argophyllum, Melodinus, Ascarina.

Predominating trees and shrubs: Dracæna terminalis, Tacca pinnatifida, Pandanus odoratissimus, Cocos nucifera,* Corypha umbraculifera, Cupressus columnaris; Casuarina equisetifolia, nodiflora; Ficus sp., Artocarpus incisa, Aleurites triloba, Embothrium strombilinum, Scævola Koenigii, Vaccinium cereum, Lobelia arborea, etc.; Coffea Kaduana, Mariniana; Kadua Cookiana, etc.; Rhizophora Mangle, gymnorhiza: Terminalia Catappa,* Barringtonia speciosa, Melaleuca virgata, etc., Osteomeles anthyllidifolia, Cassia Sophera, Mimosa Mangium, Adenanthera scandens, Blackburnia pinnata, Calophyllum Inophyllum, Clusia sessilis and pedicellata, Sapindus Saponaria; Dodonæa spathulata, viscosa; Aporetica pinnata, ternata; Grewia Mallococca; Sterculia Balanghas, fœtida; Commersonia echinata, Tetracera euryandra.

Cultivated plants: Artocarpus incisa, Caladium esculentum, (Taro,) sagittifolium; Arum macrorhizon, Tacca pinnatifida, Convolvulus chrysorhizus, Dioscorea alata, Cocos nucifera, Musa paradisiaca, Inocarpus edulis, Sterculia Balanghas; Ficus aspera, Granatum; Citrus decumana, Spondias dulcis, Mimusops dissecta, Terminalia glabra, Crataeva religiosa, Eugenia malaccensis, Dracæna terminalis, Piper methysticum, Areca oleracea, Broussonetia papyrifera.

XII. BALSAM-TREE KINGDOM.

(Arabian Kingdom.—*Forskal's Kingdom.*)

The southwesterly mountainous part of the Arabian peninsula. *Mean Temperature.* . . . . . .

Character.—Tropical, generally Indian forms.

Characteristic genera: Strœmia, Marua, Senna, Oncoba, Caucanthus, Geruma, Balsamodendron, Cadia, Orygia, Simbuleta. Some approximation to the South African flora. (Stapelia, Hæmanthus.)

* Both are growing at Key West, and Indian Key, South Florida.

Predominating trees and shrubs: Pandanus odoratissimus; Ficus Sycomorus, salicifolia, populifolia, Forskalii ,palmata, serrata, Sur, Toka; Avicennia tomentosa, Cyanchum arboreum, Coffea arabica; Balsamodendron gileadense, opobalsamum, Kataf, Kafal; Celastrus edulis, parviflora; Sterculia platanifolia, Grewia populifolia; Mœrua uniflora, racemosa.

Cultivated plants: Sorghum sp., Hordeum hexastichon, Zea Mais, Arum Colocasia, Phœnix dactylifera, Musa paradisiaca, Cocos nucifera, Tamarindus indica, Ficus Carica, Carica Papaya, Persica vulgaris, Armeniaca vulgaris, Prunus domestica, Pyrus Malus, Cydonia vulgaris, Vitis vinifera, Coffea arabica, Saccharum officinarum, Zingiber officinale, Raphanus sativus, Spinacia oleracea, Cucurbita Pepo, Dolichos sp., Gossypium arboreum, Indigofera tinctoria.*

Note.—The Persian flora is not sufficiently known.

XIII. THE DESERT KINGDOM.

(*Delile's Kingdom.*)

North Africa, south of Atlas, and the Mediterranean sea, between the 15°—30° north latitude; the northern part of Arabia. *Mean Temperature*, 7.25° to 86°.

Character.—A very poor flora. There are no characteristic orders or genera, but the following: Pennisetum dichotomum, Phœnix dactylifera, Cucifera thebaica, Euphorbia mauritanica, Ærua tomentosa; Acacia nilotica, arabica, gummifera, Senegal, Cassia obovata, Singueana; Alhaiga Maurorum, Mimosa Habbas, Zizyphus Pala Christi, Zygophyllum simplex, album; Fagonia arabica, Oudneji.

Culture only in the oases; principally Phœnix dactylifera, (†) Sorghum vulgare, Triticum vulgare, Hordeum vulgare; several sorts of fruit proper to the south of Europe and India.

XIV. TROPICAL AFRICAN KINGDOM.

(*Adanson's Kingdom.*)

Africa, from the 15° north latitude to the tropic of Capricorn, but with the exception of Abyssinia and the central highlands, (the interior of Africa and the east coast are very incompletely known.) *Mean temperature*, 72.5° to 86°.

Character.—This flora is neither rich in sorts nor in peculiar forms. Leguminosæ, Rubaceæ, Cyperaceæ, are prevalent; few Palmæ, Filices, Scitamineæ, Piperaceæ, Passifloreæ.

Characteristic genera: Adansonia, Melhania, Christiania, Pentadesma, Napoleona, Parkia, Hoflandia, Thonningia.

Predominating trees and shrubs: Annona senegalensis, ect.; Cadaba farinosa, Cratæva Adansonii, Capparis edulis, Pentadesma butyracea; Bombax pentandrum, guineense; Adansonia digitata, Sterculia acuminata,

* The intermixture of numerous tropical plants with many vegetables of the temperate or variable zone, is an additional encouragement to the gradual acclimation of tropical plan s in all our Southern States. H. P.

† Introduced by H. P. into tropical Florida. For other very valuable plants sent by him, and now growing there, see the report of the Committee on Agriculture of the House of Representatives, made on the 17th February, 1838, and the accompanying documents.

Grewia carpinifolia, Acacia sp., Cassia occidentalis, Pterocarpus esculentus, Parkia africana, Chrysobalanus Icaco,* Conocarpus pubescens, Rhizophora sp., Psychotria sp., Bignonia Tulipifera, Avicennia africana, Euphorbia frutescent species, Ficus sp., Elais guineensis, Rpahia vinifera, Phœnix spinosa, Pandanus candelabrum.

Cultivated plants: Zea Mais, Oryza sativa; Sorghum vulgare, saccharatum; Panicum sp., (Gussub.;) Dioscoria alata, sativa; Iatropha Manihot, Çaladium esculentum.

Musa sapientum, Mangifera indica, Carica Papaya,* Bromelia Ananas, Elais guineensis, Anacardium occidentale, Ficus sp., Tamarindus indica, Citrus sp., Coffea arabica; Saccharum officinarum, punctatum; Zingiber officinale; Amomum Cardamomum, Granum Paradisi.

Phaseolus vulgaris, etc., Dolichos oleraceus, Arachis hypogæa, Solanum edule, etc.

Gossypium sp., Nicotiana sp.

NOTE.—The flora of Abyssinia is unknown.

XV. KINGDOM OF THE CACTUS AND PIPERACEÆ.

(*Jacquin's Kingdom.*)

Mexico and South America to the Amazon river, and to a height of 5,000 feet above the level of the sea, 0—30° north latitude. *Mean temperature*, 68° to 83.75°.

Characteristic orders: Bromeliaceæ, Piperaceæ, Passifloreæ, Cacteæ. Numerous tropical orders: Euphorbiaceæ, Convolvulaceæ, Apocyneæ, Rubiaceæ. Tropical orders which are here less frequent than in other countries within the tropics: Filices, Scitamineæ, Orchideæ, Myrtaceæ, Leguminosæ, Terebinthaceæ, Aurantiaceæ, Tiliceæ, Malvaceæ. Extra-tropical orders appear or become more numerous: Labiatæ, Ericineæ, Campanulaceæ, Compositæ, Umbelliferæ, Crassulaceæ, Rosaceæ, Caryophylleæ, Cruciferæ, Ranunculaceæ.

Characteristic genera: Phytelephas, Kunthia, Galactodendrum, Podopterus, Salpianthus, Russellia, Lagascea, Gronovia, Inga, Thouinia, Lacepedia, Theobroma, Guazuma.

Predominating tree-like plants: Cyathea speciosa, villosa; Meniscium arborescens, Agave americana, Yucca acaulis; Cocos nucifera, butyracea; Mauritia flexuosa, Martinezia caryotifolia, Oreodoxa montana, Kunthia montana, Chamærops Mocini; Corypha Miraguana, Pumos, tectorum, etc.; Liquidambar styraciflua, Cecropia peltata, Galactodendron utile,† Rhopala obovata, Avicennia tomentosa, Ehretia ternifolia, Cordia dentata, Cereus sp., Melocactus sp., Opuntia sp., Pereskia and Mammillaria sp., Lecythis elliptica, etc.; Bertholletia excelsa, Melastomæ arborescentes; Bauhinia splendens, suaveolens, etc.; Hæmatoxylum campechianum, Cæsalpinia cassioides, etc.; Acacia cornigera, fœtida, etc.; Hymenæa Courbaril, etc.; Inga insignis, Humboldtiana, etc.; Mimosa sp., Swietenia Mahagoni, Bonplandia trifoliata.

Cultivated plants: Zea Mais, Sorghum vulgare, Ianipha Manihot, Dioscorea alata, Convolvulus Batatas.

* Wild in South Florida. H. P.

† Milk tree. H. P.

Musa paradisiaca, Mangifera indica; Annona muricata, squamosa; Psidium pomiferum and pyriferum, Cocos nucifera, Carica Papaya, Persea gratissima, Bomelia Ananas, Anacardium occidentale, Tamarindus indica, Citrus sp., Passiflora quadrangularis, Vitis vinifera, Opuntia vulgaris, Iambosa vulgaris, Theobroma Cacao, Vanilla aromatica, Coffea arabica; Saccharum officinarum, violaceum; Lycopersicum Humboldtii, Capsicum frutescens, annuum; Cajanus flavus, Arachis hypogæa, Opuntia coccinellifera, Nicotiana sp., Gossypium barbadense, etc.

XVI. KINGDOM OF THE MEXICAN HIGHLANDS.

(*Bonpland's Kingdom.*)

Mexico, elevated more than 5,000 feet. *Mean temperature*, 65.75° to 79.25°.

Character.—Tropical forms disappear or decrease: Filices arboreæ, Palmæ, Piperaceæ, Euphorbiaceæ, Melastomaceæ, Passifloreæ. Extratropical forms appear or become more numerous. Amentaceæ, (Salix, Quercus,) Coniferæ, (Pinus, Cupressus,) Labiatæ, (Salvia, Stachys, Marrubium,) Pedicularis, Anchusa, Myosotis, Polemonium, Ericeæ (Vaccinium, Arbutus, Arctostaphylos,) Synanthereæ (increasing very much,) Valeriana, Galium, Cornus, Caprifolium, Umbelliferæ, Rosaceæ. (Amygdalus, Mespilus, Rosa, Potentilla,) Caryophylleæ, (Arenaria,) Cruciferæ, (Draba,) Ranunculaceæ, (Anemone, Ranunculus.)

Characteristic genera: Mirabilis, Maurandia, Leucophyllum, Hoitzia Georgina, Zinnia, Sckhuria, Ximenesia, Lopezia, Vauquelinia, Choisya, Cheirostemon.

Predominating trees and shrubs: Pinus occidentalis, Abies hertella; Cupressus thurifera, sabinoides; Taxodium distichum, Quercus sp. 16; Salix Bonplandiana, paradoxa, etc.; Arbutus mollis, petiolaris, etc.; Arctostaphylos polifolia, pungens, etc.; Vaccinium, geminiflorum, stamineum, confertum; Rosa Montezumæ, Mespilus pubescens, Amygdalus microphylla, Cheirostemon platanoides.

Cultivated plants: Maize, the European cerealia, and fruits.

Note.—In the highest mountain-regions the flora has an alpine aspect: here appear Cyperus toluccensis, Chelone gentianoides, Cnicus nivalis, Ageratum arbutifolium, Senecio procumbens, etc., Potentilla ranunculoides; Lupinus elegans, montanus; Arenaria bryoides.

XVII. KINGDOM OF THE CINCHONÆ.

(*Humboldt's Kingdom.*)

The Andes, between 20° south latitude and 5° north latitude, from 5,000 to 9,000 feet in elevation. *Mean Temperature*, 59° to 68°.

Character.—Extra-tropical forms appear or become more frequent: Gramineæ, Amentaceæ, (Quercus, Salix,) Labiateæ, (Salvia, Stachys, Scutellaria,) Anchusa, Myosotis, Swertia, Ericeæ, Synanthereæ, (very numerous,) Caprifoliaceæ, (Viburnum, Sambucus,) Umbelliferæ, (Ferula, Ligusticum,) Rosaceæ, Cruciferæ Ranunculaceæ. On the contrary, some tropical forms disappear, or become scarce; but yet several sorts of Palmæ, Piperaceæ, Cacteæ, Passifloreæ, Melastomaceæ, go to a considerable height.

Characteristic genera: Lilæa, Cervantesia, Oreocallis, Lachnostoma,

Gaylussaccia, Stevia, Flaveria, Tagetes, Espeletia, Cinchona, Guilleminia, Loasa, Kageneckia, Negritia, Amicia, Perrottetia, Dulongia, Laplacea, Fre-Freziera, Abatia, Monnina.

Predominating tree-like plants: Oredoxa frigida, Cereoxylon andicola, Podocarpus taxifolia, Salix Humboldtiana; Quercus Humboldtiana, almaguerensis, tomilensis; Ficus velutina, Rhopala cordifolia, Oreocallis grandiflora; Persea lævigata, Mutisii, sericea; Octea mollis, sericea; Vaccinium caracasanum, Andromeda bracamorensis; Befaria glauca, ledifolia; Cinchona Condaminea, cordifolia, oblongifolia, etc.; Weinmannia elliptica, Balbisiana, etc.; Osteomeles glabrata, Rubus floribundus; Ilex bumelioides, myricoides; Clusia elliptica.

Cultivated plants: The tropical cultivated plants mentioned under xv. disappear nearly totally. But yet in this kingdom maize and coffee are grown: they are joined with the European cerealia and fruits, potatoes, and Chenopodium Quinoa.

XVIII. KINGDOM OF ESCALLONIAS AND CALCEOLARIAS.

(*Ruiz and Pavon's Kingdom.*)

The Andes, between 20° south latitude and 5° north latitude, and more than 9,000 feet above the level of the sea. Paramo and Paxonal. *Mean Temperature*, 34.25° to 59°.

Character.—Tropical forms almost entirely disappear; but still the following genera are found: Tillandsia, Oncidium, Peperomia, Rhexia, and Passiflora. On the contrary, the forms which characterise the colder and polar zone become frequent: Lichenosæ, Musci, Carex, Luzula, Alnus, Rumex, Plantago Gentiana, Swertia, Vaccinium, Campanula, Cacalia, Senecio Umbelliferæ, Valeriana, Saxifraga, Ribes, Rubus, Alchemilla, Caryophylleæ, (Sagina, Arenaria, Cerastium, Stellaria,) Cruciferæ, Draba, Arabis.) Prevalent orders: Synantherеæ, Gramineæ, Ericeæ.

No large trees. Characteristic genera: Deyeuxia, Tigridia, Gardoquia, Calceolaria, Thibaudia, Lysipoma, Barnadesia, Hæmanthus, Chuquiraga, Culcitium, Wernera, Dumerilia, Escallonia, Pectophytum, Klaprothia, Polylepis.

Predominating shrubs: Alnus ferruginea, acuminata; Vaccinium acuminatum, empetrifolium, floribundum, etc.; Thibaudia rupestris, floribunda, longifolia, strobilifera; Befaria grandiflora, and coarctata; Ribes frigidum; Escallonia myrtilloides, tortuosa, Tubar, berberidifolia; Ilex scopulorum, Drymis granatensis.

XIX. WEST INDIAN KINGDOM.

(*Swartz's Kingdom.*)

The West-Indian Islands. *Mean Temperature*, 59° to 79.25°.

Charactr.—The flora of this group of islands approaches that of the continent, but is chiefly distinguished (as the flora of Polynesia is from the Indian) by the great quantity of Filices and Orchideæ.* Besides these orders, the following genera belong to the characteristic forms: Thrynax, Epistylium, Alchornea, Tanaëcium, Tetranthus, Catesbæa, Belonia, Portlandia, Picramnia, Legnotis, Lithophila, Valentinia, Hypelate.

* Abound on the Florida Isles. H. P.

Among the predominating woody plants, merit to be mentioned, Cocos nucifera, Pinus occidentalis, Laurus sp., Melastoma sp., Myrtus sp. Uvaria sp.

The cultivated plants are the same as in XV.

XX. KINGDOM OF PALMS AND MELASTOMÆ.

(*Martius's Kingdom.*)

Brazil, or South America on the east of the Andes, between the equator and the tropic of Capricorn. *Mean Temperature*, 59° to 83.7°.

Character.—It is probably this part of the surface of the earth in which the vegetable kingdom shows itself in the greatest abundance and variety. Especially remarkable for richness in genera and species, size of individuals, impenetrable woods, numerous climbing and parasitical plants. As characteristic though not peculiar orders, may be mentioned Palmæ, Hæmodoraceæ, Gesnerieæ, Melastomaceæ, Sapindaceæ; the order Vochyaceæ is peculiar. Of peculiar genera there are too many to enumerate; among the most remarkable are Vellosia, Barbacenia, Manihot, Franciscea, Ditassa, Lychnophora, Diplusodon, Kielmeyera, Sauvagesia, Lavradia.

Characteristic genera and species, according to their different localities: In the primitive woods, Palmarum, genera varia: Thoa, Ficus, Cecropia, Anda, Rhopala, Myristica, Bignonia, Theophrasta, Stiftia, Oxyanthus, Coutarea, Psycotria, Bertiera, Feuillea, Carica, Myrtus, Gustavia, Lecythis, Bertholletia, Melastoma, Hymenæa, Dimorpha, Trattininkia, Pilocarpus, Trichilia, Cedrela, Cupania, Bannisteria, Hippocratea, Caryocar, Marcgravia. Clusia, Colophyllum, Sloanea, Göthea, Lebretonia, Abroma, Carolinea, Bixa, Uvaria.

In the Catingas, (deciduous woods:) Iathropa sp., Acacia sp., Mimosa sp., Cæsalpinia pubescens etc., Spondias tuberosa, Thryallis brasiliensis, Chorisia ventricosa, Bombax sp., Eriodendron sp., Pourretia ventricosa, Capparis lineata, etc., Anona obtusifolia, etc.

In the open bushy plains, (campos,) Paniceæ, Amaryllis, Alstrœmeria, Vellosia, Barbacenia, Burmannia, Stelis, Cnemidostachys, Rhopala, Laurus, Ocotea, Gomphrena, Lantana, Echites, Hancornia speciosa, Gesneria, Lychnophora, Bacharris, Vernonia, Mikania, Stevia, Melastoma, Rhexia, Terminalia fagifolia, Gaudichaudia, Sauvagesia, Davradia, Plectranthera.

On the sea coast: Cocos schizophylla, Diplothemium maritimum, Eriocaulon sp., Xyris sp., Avicennia tomentosa, Rizophora Mangle, Conocarpus erectus, Laguncularia racemosa, Bucida Buceras.

The cultivated plants are nearly the same as in fifteen. Thea chinensis.

XXI. KINGDOM OF WOODY COMPOSITÆ.

(*St. Hilaire's Kingdom.*)

South America on the east of the Andes from the tropic of Capricorn to 40° south latitude. *Mean Temperature*, 59° to 74.75°.

Character.—Tropical forms decrease or disappear, extra-tropical, particularly European, take their places: Ranunculaceæ, Cruciferæ, Helianthemum, Caryophylleæ. Lathyrus, Galium, Teucrium, Plantago, Carex; some South African: Polygala, Oxalis, Gnaphalium. More than half of the genera are common to this kingdom and Europe. Many compositæ,

among them many woody ones. Larrea, Hostia, Diposis, Boopis, Acicarpha, Cortesia, Petunia, Iaborosa, Tricyla, Caperonia, Bipinnula.

Generally naked plains, (pampas,) where grasses and thistles are predominating.

Cultivated plants: the most European are wheat and vine. The peach tree is very much dispersed.

NOTE.—The Chilian flora is not sufficiently known, and the indications of heights are wanting. Probably several kingdoms are to be distinguished here. Perhaps the highest regions belong to kingdom XVIII.

XXII. ANTARCTIC KINGDOM.

(*Urville's Kingdom.*)

The south-westerly part of Patagonia; Tierro del Fuego, and the Falkland Islands, between 50° and 55° south latitude. *Mean Temperature*, 41° to 47.75°.

Character.—Great resemblance with the North European flora. (Kingdom II.) Tropical forms entirely disappear. Prevalent orders: Synantheræ, Gramineæ, Cariceæ, Musci. Lichenosæ. Frequent also are Ranunculaceæ, Cruciferæ, Caryophylleæ, Rosaceæ, Umbelliferæ: two thirds of the genera are found in Europe. A slight approximation to South Africa: Gladiolus, Witsenia, Galaxia, Crassula; and to New Holland: Embothrium, Ourisia, Stylideæ, Mniarum. Characteristic genera: Gaimardia, Astelia, Callixene, Philesia, Drapetes, Bœa, Calceolaria, Pernettia, Oligosporus, Nassavia, Bolax, Azorella, Donatia, Acæna, Hamadryas.

Predominating tree-like plants: Fagus antarctica, Salix magellanica, Embothrium coccineum; Pernettia empetrifolia, mucronata; Andromeda Myrsinites, Baccharis tridentata, Chiliotrichum amelloides, Ribes magellanicum, Escallonia serrata, Fuchsia coccinea, Myrtus nummularia; Berberis ilicifolia, inermis, microphylla, empetrifolia; Drymis Winteri.

No culture.

XXIII. KINGDOM OF STAPELIAS AND MESEMBRYANTHEMUMS.

(*Thunberg's Kingdom.*)

South Africa, from the tropic to 35° south latitude. *Mean Temperature*, 35.5° to 72.5°.

Character.—The flora is very rich in forms, but by no means luxuriant; there are no large thick woods, nor any climbers; but many succulent plants. Characteristic orders: Restiaceæ, Irideæ, Proteaceæ, Ericaceæ, Ficoideæ, Bruniaceæ. Diosmeæ Geranieæ, Oxalideæ, Polygaleæ Genera: Restio, Ixia, Gladiolus, Moræa. Watsonia, Hæmanthus, Strumaria, Agapanthus, Eucomis, Massonia, Strelitzia, Aphyteia, Passerina, Gnidia, Protea, Leucadendron, Leucospermum, Serruria, et Proteacearum pl genera, Stilbe, Selago, Stapelia, Erica. Gnaphalium, Elichrysum, Stobæa, Pteronia, Osteospermum, Tarchonanthus, Relhania, Gorteria, Arctotis, Othonna, Stœbe, Œdera, Anthospermum, Mesembryanthemum, Vahlia, Liparia, Borbonia, Lebeckia, Raffnia, Aspalathus, Staavia, Brunia, Phylica, Diosma, Pelargonium, Oxalis, Sparmannia, Muraltia, Polygala, Penæa.

Prevailing forms. On the sandy coasts: Stapelia, Irideæ, Mesembryan-

themum, Restio, Diosma. On the mountains: Proteaceæ, Erica, Crassula. In the dry high plains (karro): Acacia capensis, Giraffa, detinens, viridiramis; Euphrobia mauritanica, tenax; Poa spinosa, Mesembryanthemum sp., Aloe, Irideæ, but not any Proteaceæ, Erica, Diosmeæ, Restio.

Some other remarkable species: Hæmanthus coccineus, Amaryllis toxicaria, Testudinaria montana and Elephantopus, Podocarpus elongatus, Salix Gariepina; Protea mellifera grandiflora; Leucadendron argenteum, Laurus bullata, Lycium tetrandrum, Olea similis, Rhigozum trichotomum, Tarchonanthus camphoratus, Stœbe Rhinocerotis, Crassula coccinea, Portulacaria afra; Mesembryanthemum edule, turbiniforme; Metrosideros angustifolia, Acacia elephantina, Zizyphus bubalina, Calodendron capense.

Cultivated plants: the European cerealia, fruits and vegetables; also, Sorghum caffrorum, Convolvulus Batatas, Musa paradisiaca, Tamarindus indica, Psidium pomiferum, Citrus decumana.

XXIV. KINGDOM OF EUCALYPTI AND EPACRIDEÆ.

(*R. Brown's Kingdom.*)

Extra-tropical New Holland, and Van Diemen's Land. *Mean Temperature*, +52.25° to +72.5°.

Character.—One of the richest and most peculiar floras; although without any considerable abundance of vegetation. The characteristic orders and genera are: Xerotes, Xanthorrhœa, Pterostylis, Casuarineæ, Leptomeria, Pimelea, Proteaceæ (Banksia, Hakea, Persoonia, Grevillea, Petraphila, Isopogon, Dryandra), Myoporineæ, Westringia, Logania, Mitrasacme, Epacrideæ, (Epacris, Leucopogon, Styphelia,) Stackhouseæ, Scævoleæ, Goodenovieæ, Stylideæ, Eucalyptus, Melaleuca, Leptospermum, Acaciæ aphyllæ, Platylobium, Bossiæa Diosmeæ, (Boronia, Zieria,) Pittosporeæ, Tremandreæ, Pleurandra, Hibbertia.

Predominating trees and shrubs: Three fourths of the woods are formed of species of Eucalyptus, whose number exceeds a hundred. Next to them, the Proteaceæ, Epacrideæ, Diosmeæ, Casuarineæ, Acaciæ aphyllæ, form woods and bushes. Of Coniferæ, Araucaria excelsa, Podocarpus spinulosus, are found.

Cultivated plants: The European cerealia and fruits.

Note.—Tropical New Holland is not sufficiently examined; its flora is less peculiar, and perhaps but a province of the Polynesian kingdom (IX.)

XXV. NEW ZEALAND KINGDOM.

(*Forster's Kingdom.*)

The two New Zealand islands. *Mean temperature*, temperate.

Character.—Tropical forms disappear, or appear very sparingly.* One-half of the genera are European. Approximation to New Holland; Pimelea, Myoporum. Epacris, Styphelia, Cassinia, Melaleuca: to South Africa; Restio, Gnaphalium, Xeranthemum, Tetragonia, Mesembryanthemum, Oxalis:

* Tropical plants are sufficiently abundant to warrant the human certainty, that the Flax lily can be propagated in Florida and the Southern States. In Charleston, S. C., it flourishes in the open air; and why not, as well as its countryman the Paper Mulberry?

H. P.

to the Arctic kingdom; Mniarum, Fuchsia, Acæna, Drymis, a great many Filices; Phormium, Pennantie, Knightia, Forstera, Shavia, Griselina, Melicope, Dicera, Plagianthus, Melictus.

Characteristic species: Cyathea medullaris, Gleichenia furcata, Dracæna indivisa, australis; Phormium tenax, Areca, sapida, Knightia excelsa, Avicennia resinifera, Andromeda rupestris, Epacris juniperina etc., Weinmannia racemosa, Tetragonia expansa, Fuchsia excorticata, Melaleuca sp.; Dicera dentata, serrata.

Cultivated plants: Caladium esculentum, Convolvulus chrysorhizus, Phormium tenax, Broussonetia papyrifera. (Acclimated in the United States.)

This is obviously an imperfect sketch, and has many faults; but it is upon the whole the best general view that has been taken of the subject, and has the advantage of showing the student in what way to turn his attention to the inquiry.

In concluding this important and very interesting subject, I must refer the reader who is desirous of further information to the writings of Brown in the appendix to Captain Flinder's voyages, and Tuckey's expedition to the Congo, to Decandolle's Essay upon the Geography of Plants, published in the 18th vol. of the Dictionnaire des Sciences Naturelles; to the numerous writings of Humboldt; to the observations upon the subject by Schouw, as translated in Brewster's Edinburgh Journal, and to Boyle's most instructive work on the flora of the north of India and Cashmere.

INDEX

OF OFFICINAL AND ŒCONOMICAL PLANTS, MENTIONED IN THE NATURAL SYSTEM OF BOTANY OF J. LINDLEY, 2D EDITION, 1835, WITH SOME ADDITIONS INSERTED BY DOCTOR H. PERRINE.

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* The asterisk prefixed to names indicates indigenous plants of tropical Florida.

† The cross prefixed to names indicates that those plants are growing in tropical Florida; but does not decide whether they be acclimated or indigenous.

P The P affixed to names indicates the seeds or plants sent by H. Perrine to tropical Florida, but of a very small number compared with the whole. When the P is affixed to any name with a * or † prefixed, it shows that H. P. also sent or carried the same kind of seeds and plants to tropical Florida with the hope that they might be superior varieties.

Abaca
Abelmoschus moschatus, 96
Abies pectinata, 316
balsamea, 316
canadensis, 316
Douglasii, 315
nigra, 316
Abricot sauvage, 47
Abroma augustum, 94
Abronia. 214
* Abrus precatorius, 152, 153, P
Abuta amara, 215
caudicans, 215
Abutilon esculentum, 96
Acacia arabica, 154, 155
nilotica, 154, 155
Catechu, 155
scandens, 155
senegalensis, 155
decurrens, 154
farnesiana, 154
Verek, 154
Seyal, 154
speciosa, 154, 155
Kalkera, 155
elata, 155
xylocarpa. 155
Sundra, 155
odoratissima, 155
stipulacea, 155
cinerea, 155
concinna, 155
juliflora, 155
ferruginea, 155
leucophœa, 155
Acalypha Cupameni, 114
Acanthus mollis, 285
Acer saccharinum, 81
Achillea, 253
Achillea nana, 254
Achras Sapota, 226, P
† *Achras Sapodilla*, P
Achras mammosa, 226, P
Acid, benzoic, 254
kinic, 244
Açoita cavallos, 99
Aconitum Cammarum, 6
Napellus, 6
ferox, 6
Acorus Calamus, 309, 364, 365
Acrostichum Huaczaro, 400
Actæa racemosa, 6
Adansonia, 94
Adenanthera pavonina, 154
Adiantum melanocaulon, 400
pedatum, 400
Capillus Veneris, 400
Adonis, 6
Æcidium, 423
Æchynomene paludosa
Ægle Marmelos, 106
Æthusa Cynapium. 23
Agaric of the olive, 422
Agaricus campestris, 422
bulbosus, 422
cordatum
Agave—many species
Sisalana, P
Pulque, P
Mezcal

Agila wood, 197
Agrimonia Eupatoria, 144
Airi, 346
Akund, 305
Alangium decapetalum, 39
hexapetalum, 39
Alaria esculenta, 434
Alcamphora, 114
Alchemilla vulgaris, 148
Alectoria jubata, 429
usneodes, 429
Aleurites ambinux, 114
triloba
Aletris farinosa, 353
Algæ, 434
Algaroba, 154
bean, 154
Alhagi Maurorum, 152
Alisma Plantago, 356
Alkanet, 274
Allamanda cathartica, 300
Allecrim brabo, 78
Almond, 147
Aloe, 353
Barbadensis
Socotarina
spicata, 353
perfoliata, 353
Aloes wood, 197
Aloexylum Agallochum, 154
Alpinia nutans, 323
racemosa, 323
Galanga, 323
Alstonia theiformis, 228
Alströmeria salsilla, 329
pallida, 329
Alstromeria peregrina
edulis
revoluta
ligtu
latifolia
Althæa rosea, 96
officinalis, 96
Althein, 96
Alum root, 138, 163
Amadou, 421
Amanita muscaria, 422
Amaranthus obtusifolius, 208
Amaryllis ornata, 329
American Gummi Gutta, 78
Amomum aromaticum, 323
Grana Paradisi, 324
Amomum maximum, 321
Amygdalus persica, 147
Amyris Commiphora, 165
hexandra, 165
toxifera, 165
ambrosiaca, 165
Anagallis arvensis, 223, 224
cœrulea, 224
Anacardium occidentale, 167
Anagyris, fœtida, 153
Ananas, 334
Anchietea salutaris, 64
Anchusa virginica, 274
tinctoria, 274
Anda, 113, 114
Andromeda ovalifolia, 221
arborea
Andropogon Schœnanthus, 377
citratum, 377
Nardus, 377
Angiopteris evecta, 400
Angostura bark, 132
Anise, 22
Anisochilus, 276
* Anona palustris, 19
laurifolia, 22
sylvatica, 19
squamosa, 18
Anona squamosa, P
muricata, P
cherimoyer, P
Anthemis Pyrethrum, 253
Cotula, 253
Anthericum bicolor, 353
Anthoxanthum odoratum, 377
Anthyllis cretica, 153
Antirhea, 244
* Apios, 152
tuberosa
Apple, 146
Apteria setacea, 331
Aquilaria Agallochum, 197
ovata, 197
Aquilegia, 6
Arabis chinensis, 59
* *Arachis hypogæa*
Aralia nudicaulis, 25
Arar tree, 316
Aratien do Mato, 19
Araucaria Dombeyi, 316
Arayana, 282
Arbutus Unedo, 221

Arbre à perruque, 167
Archill, 429
Arctostaphylos Uva Ursi, 220
alpina, 220
Arctium Bardana, 254
Areca Catechu, 345, (*olerciea,* 170 *feet !*)
Nut, 345
Argemone mexicana, 8
Aristolochia rotunda, 206
longa, 206
Clematitis, 206
bracteata, 206
indica, 206
odoratissima, 206
fragrantissima, 206
anguicida
serpentaria, 184, 206
trilobata, 206
grandiflora, 206
Arnica, 253
Arnotto Tribe, 73
Shrub, P
Arracacha, 22, 140
Arraciesculaenta
† Arrow-root, 332, P
Artabotrys odoratissima, 18
Artemisia chinensis, 253
maderaspatana, 253
indica, 253
Dracunculus, 254
Artichoke, 254
Jerusalem, 254
Arum ovatum, 364
esculentum, 364, P
triphyllum, 364
Colocasia, 364
mucronatum, 364
violaceum, 364
maculatum, 364
sagittifolium, 364, P
cordifolium, 364
italicum, 364
Arundo arenaria, 377
nitida
donax
phragmitis
Arvore de Paina, 94
Asarabacca, 206
Asarum canadense, 206
europæum, 206
Asclepias decumbens, 304
Asclepias lactifera, 304
aphylla, 304
stipitacea, 304
volubilis, 304
tuberosa, 304
curassavica, 305
Ash, 308
Asimina triloba, 19
Asparagin, 96
Asparagus, 210, 353
Asperula cynanchica, 250
odorata, 250
Aspidium fragrans, 400
Filix mas, 400
Assafœtida, 23
Astragalus verus, 153
Astranthus, 79
Ativisha, 6
Atriplex hortensis, 208, 209
Atropa Belladonna, 294
Attar of Roses, 144
Attedia squamata
Augia, 167
Avellana, 200
Averrhoa, 140
Bilimbi, 140
Carambola
* *Avicennia tormentosa*
Azalea procumbens, 220
pontica, 221
Bactris acanthocarpos
Balanites Ægyptiaca, 33
Balm of Gilead, 111, 316
Balsam, Canadian, 316
Hungarian, 316
Carpathian, 316
of Copaiva, 104, 111, 165
of Acouchi, 111
of Mecca, 111
of Peru, 104, 165
of Gilead, 276
of Tolu, 165
of Umiri, 104
Balsamodendrum gileadense, 111
Myrrha, 111
Opobalsamum, 111
* Bamboo, 377
Banana, 327
Banyan tree, 94, 177
Baobab, 94
Baphia, 153

Baptisia tinctoria, 153
Barbadoes aloes, 353
Barilla, 177
Barley, 376
Basella, 298
rabra alba
Basil, 276
Bassia butyracea, 226
butter
longifolia, 226
Bassorin, 339
Batis, 177
Bauhinia tomentosa, 154
variegata, 154
racemosa, 154
retusa, 154
emarginata, 154
parviflora, 154
Bdellium, 165
Beam tree, 146
Bean, 152
Beans, 153
Beech, 170
Beer, 429
Beet, 208
Bejuca de la Estrella, 206
Belleric Myrobalan, 38
Bençao de Deos, 96
Benincasa cerifera, 52
Ben-nuts, 66
Benthamia, 49
Benzoin, 39, 228
Bemorellana, P
Berberis vulgaris, 30
Berberry, 30
Berchemia volubilis, 108
Bergera Kõnigii, 106
Berrya ammonilla, 99
Betel, 186, 278
Betel nut, 345
Bidens tripartita, 253
Bignonia Chica, 282
Cherere, 282
Bikh, or Bish, 6
Bilberry, 222
Billardiera, 32
Biophytum, 140
Birch, black, 171
Birdlime, 300
Bishma, or Bikhma, 6
Bistortiamontana
Blackberry, 144
Black tea, 147
Bladder green, 108
Blakea triplinervia, 42
Bletia verecundia. 339
Blighia sapida, 82
Bobas, 133
Bois de Joli cœur, 32
puant, 46
d'huile, 123
Boldu, 189
Boletus igniarius, 424
Bombax, 94
Ceiba, P
pentandrum, 94, P
Boneset, 253
Bonplandia trifoliata, 132
Borago officinalis, 274
Borassus Gomutus
Borrera furfuracea, 429
Boswellia serrata, 111
glabra, 111
Box, 113
Brayera anthelmintica, 144
Brazilian tea, 278
Brazil nuts, 47
Brazil wood, 154
Braziletto wood, 152
Bread Fruit
Brejeuba, 346
Bridelia spinosa, 114
Bromelia, 334
Pita, P
variegata
sagenaria
Grawatha
Broom, 152
Brosimum alicastrum, 177
Brossæa coccinea, 220
Broussonetia papyrifera, 177
Brucea, 136
ferruginea. 133
sumatrana, 136
antidysenterica, 136
Brucia, 136
Bryonia rostrata, 52
cordifolia, 52
epigæa, 52
scabra, 52
Bucida Buceras. 38
Buck wheat, 211
Bucku plants, 132
Bukkum wood, 154

Buena hexandra, 244
Bunium Bulbocastanum, 22
Burabara, 295
Burnet, 148
* *Bursera gummifora*
Bursera paniculata, 111
acuminata, 111
Butea frondosa, 152, 153
superba, 152, 153
Butter tree, 226, 76
of Africa
of India
Butterfly weed, 304
Butua do curvo, 80
Caapim de Angola, 378
Cabbage, 59
Cabuya
Cacalia sonchifolia, 253
alpina, 253
sarracenica, 253
Cachen, 297
Cactus coccenilifer, P
C. Pitahaya
**Cactus*, 5 *species*
Cæsalpinia braziliensis, 151
Bonduccella, 154
sappan, 154
oleosperma, 154
Caffein, 245
Cajanus, 152
Cajeputi Oil, 45
Caladium Seguinum, 364
Calamus Draco, 346
Calathea, 326
Calceolaria, 291
Calendula, 253
Callicarpa lanata, 278
Calaba, 75
Calophyllum angustifolium, 75
inophyllum, 75
Calotropis gigantea, 305
Calumbo root, 52, 215, 297
Calyptranthus aromatica, 45
Cambäibinha, 20
Camellia oleifera, 80
japonica, 80
Camomile, 253
Campanula Rapunculus, 238
Camphor, 201, 276
Camphor oil, 98
Camphor Tree, 98
Cana brava
Canarina campanula, 238
Canarium commune, 111
Cannabis sativa, 176
Canna, 326
Caoutchouc, 113, 116, 176, 177, 300, 305
Caper, 61
Capillaire, 400
Capitao do Matto, 278
Capparis pulcherrima, 61
Capsicum var, species P
Capsicum, 294
Carapa obovata, 102
Caraway, 22
Carbazotic acid, 153
Cardamom of Malabar, 323
Cardamoms, 323
Cardiospermum halicacabum, 82
Cardo santo, 8
Cardoon, 254
Carduus benedictus, 254
Marianus, 254
Carex arenaria, 385
disticha, 385
hirta, 385
**Carica papaya*, P
Carissa carandas, 301
edulis, 301
Carlina acanthifolia, 254
Carob Tree, 154
Carrot, 22
Carthamus tinctorius, 254
Caruata
Carya alba, 180
Caryophyllus aromaticus, 45
Casca d'Anta, 17
de larangeira da terra, 133
Cascarilla, 114
Casearia lingua, 65
ulmifolia, 65
Cashew Nut, 167, P
Cassava, 115, 294, P
Cassia, 201
obovata elongata
marilandica, 154
acutifolia, 153
Senna, 153
lanceolata, 153
Sabak, 155
auriculata, 154
Cassuvium occidentale, 167
Castilloa elastica, 177
Catasetum, 339
Cataya, 211

Catechu, 155, 346
Cathartine, 153
Cathartocarpus Fistula, 154, P
Caturus spiciflorus, 113, 114
Ceanothus americanus, 108
Cecropia peltata, 176
Cedar, 315
Cedar Virginian, 315
Cedrela, 102, 103,
odorata, P
angustifolia, 104
febrifuga, 103
Toona, 103
Celastrus edulis, 119
nutans, 119
Celery, 22
Cenomyce pyxidata, 429
coccifera, 429
rangiferina, 429
Centaurea calcitrapa, 254
Cephaelis Ipecacuanha, 244
Cerasus occidentalis, 147
virginiana, 147
Capollim, 147
capricida, 147
avium, 147
Ceratonia Siliqua, 154
Cerbera Manghas, 300
Tanghin, 300
Circis, 152
Ceroxylon andicola, 346, (180 ft.)
Cetraria islandica, 429
nivalis, 429
Cha de frade, 65
pedestre, 278
Chagas da Miuda, 140
Chailletia toxicaria, 109
Champ, 16
Chapara Manteca, 122
Chard Beet, 208
Chenopodium Botrys, 209
vulvaria, 209
ambrosiodes, 209
Quinoa, 209
Chenopodium anthelminticum, quinoa, 209
Cherimoyer, 19, P
Cheris, 176
Cherry, 147
Chica, 282
Chicha, 94
Chicoriumintybus
Chicot, 66
Chimaphila umbellata, 219
maculata, 219
China, 244
Chinese Varnish, 115
Chinese Tea, 278
Chiococca anguifuga, 244
densifolia, 244
Chin-chon, 435
Chinioidia, 244
Chive, 353
Chlora perfoliata, 297
Chloranthus officinalis, 184
Chloroxylon Swietenia, 104
Dupada, 316
Choco, 52
Chocolate, 94, 342
Chondrus crispus, 435
Choopa, 82
Chorda filum, 435
Chorisia speciosa, 94
*Chrysobalanus Icaco, 159, P
luteus, 159
Chrysophyllum caimito, P
ovaliforme, P
Chumbelee, 309
Chymocarpus, 140
Cicca disticha, 113, 114
†racemosa, 114
Cicer arietinum, 19
Cicuta virosa, 23
Cinchona, 46, 144, 244
Cinchona Forest, 244
Cinchonia, 244
Cinnamon, 201
Cissampelos obtecta, 216
ovalifolia, 215
ebracteata, 215
Pareira, 215
Cissus cordata, 31
setosa, 31
Cistus creticus, 91
Citron, 105
Claytonia perfoliata, 124
Clematis recta, 6
Flammula, 6
Cleome dodecandra, 91
icosandra, 61
Clitoria, 152
ternatea, 153
Clover, 152
Cloves, 45

Cloves cobaldscandens
Clusia insignis, 75
Cluytia collina, 144
Coca leaf. 123
Cocallera, 114
*Coccoloba uvifera, 211
Cocculus cinerascens, 215
suberosus, 215
indicus, 216, 245
platyphyllus, 215
peltatus, 215
Cochineal cactus, P
Cocculus crispus, 215
Fibraurea, 215
Bakis, 215
Cebatha, 216
Cochlospermum insigne, 80
Gossypium, 80
tinctorium, 80
Codarium entifolium
Cocoa, 94
*Cocoa Nut, 345
*Cocoa plum, 159
Cocoa root, 364, P
Cocos maldivica, 301
Codiæum variegatum, 114
Coentrilho, 136
Coffea, 245, 333
Coffee arabica, 245, P
Coir rope, 345
Colchicum, 348
Colocynth gourd, 52
Colycynthin, 52
Colutea arborescens, 152
Combretum alternifolium, 39
Comocladia, 157
Commia, 113
cochinchinensis, 114
Comptonia asplenifolia, 180
Conessi bark, 300
Conium maculatum, 23, *moschatum*
Conocarpus racemosa, 38
Conohoria Lobolobo. 63
Convolvulus Jalapa, 231
Scammonia, 231
Turpethum, 231
mechoacanus, 231
sepium, 231
arvensis, 231
Soldanella, 231
macrorhizus, 231
maritimus, 231
Convolvulus macrocarpus, 231
ponduratus, 231
rosewood
floridibus, 231
scoparius, 231
dissectus, 231
Batatus, 231
edulis, 231
Conyza, 253
Cookia punctata, 105
*Coontie chatta
*Coontie adka
Copaifera, 165
multijuga, 165
Copaiva, 104
Copal, 98, 154
Coptis trifolia, 6
Corchorus olitorius, 99
capsularis, 99
siliquosus, P
Cordia Myxa, 273
†Sebestena, 273, P
Coreopsis Bidens, 253
Coriander, 22
Coriaria myrtifolia, 141
napalensis, 141
Cork, 170
Cork barks
Cork woods
Cork roots
Corn, 376
Cornus mascula, 49
florida, 49
sericea, 49
Coronilla picta, 153
varia, 153
Emerus, 152
Coronilla seeds, 153
Corsican moss, 435
Corydalin, 10
Corydalis tuberosa, 10
Corypha tectorum
inermus
Cotton, 96
Cotton Tree, 94
Cotton vine, P
Cotton Thedpey seed, P
Cotton nankin, P
Coumarouna odorata, 153
Coumarin, 153
Couroupita guianensis, 47
Coutarea speciosa, 244

Coutoubea alba, 297
purpurea, 297
Cowhage, 152
Cow-plant of Ceylon, 304
Cowslip, 223
Cow Tree, 177, 226
Cow tree of Brazil
Cranberry, 222
Cranberry Australian, 222
Cratæva gynandra, 61
Cream fruit, 301
Crescentia cujete, P
cucurbita, P
pepino, P
Cress, 59
Creyat, 285
Crocus sativus, 333
Crotalaria juncea, 152
Croton Cascarilla, 113
Tiglium, 113
Eluteria, 114
perdicipes, 114
campestris, 114
tinctorium, 114
gratissimum, 114
Crozophora tinctoria, 114
Cruciferæ, 59
Cubebs, 186
Cucumber, 52
Cucumber, spirting, 52
Cucumis Colocynthis, 52
Cudbear, 429
Cunila mariana, 276
Curatella Cambaiba, 20
Curcuma angustifolia, 324
longa, 324
Zedoaria, 323
Zerumbet, 323
Roscoeana, 323
Currant, 26
Cusparia febrifuga, 133
† Custard Apple, 19
Cyathea medullaris, 400
Cycas circinalis, 313
Cyclamen, 223
Cynanchum Argel, 153, 300, 305
tomentosum, 304
ovalifolium, 305
Cynara Scolymus, 254
Cynodon Dactylon, 377
Cynomorium, 394
Cynopia, 23
Cynosurus cristatus, 379
Cyperus longus, 385
rotundus, 385
perennis, 385
odoratus, 385
Hydra, 385
Papyrus, 385
Cyrtopodium, 339
Cytinus, 393
Cytisine, 152
Cytissus, 152, 153
cajan

Dacha, 176
Dacrydium taxifolium, 317
Dalbergia, 153
monetaria, 152
Dammar, 316
Pine, 316
Dammara australis, 315
Daoun Setan, 176
Daphne Laureola, 195
D. cannabinis
Gnidium, 195
Bholua, 195
Date, 345, P
Datisca, 180
Datura Stramonium, 294
Davilla rugosa, 20
elliptica, 20
Deal, 315
Dioscorea sativa
alata
bulbifera
aculeata
pentaphylla
brasiliensis
Delphine, 6
Delphinium consolida, 6
Staphysagria, 6
Dendrobium pierardi
Desmodium diffusum, 152
Devil's leaf, 176
Dhaee, 100
Dhamnoo, 99
Dhoona, 98
Dhoona or dammer pitch, 98
Dhoonatil, 98
Dictamnus, 133
Digitalis, 291
Dilatris tinctoria, 330

Dill, 22
Dillisk, 434
Dillenia scabrella, 20
speciosa, 20
Diosma, 132
Diospyrus virginiana, 227
Ebenus, 227
Ebenaster, 227
melonoxylon, 227
Mabolo, 227
tomentosa, 227
Roylei, 227
Embryopteris, 227
Diplazium esculentum, 400
Diplolepis vomitoria, 304
Dipsacus Fullonum, 265
Dipterix odorata, 153
Dolichos tuberosus, 152, P
bulbosus, 152, P
lablad
sixquipedalis
catjang
soja
biflorus
sinensis
Dorema ammoniacum, 23
Dorstenia contrayerva, 177
Dracæna Draco, 353
terminalis, 353
Dracontium polyphyllum, 364
pertusum, 364
Dragoon's Blood, 152, 346
Drimys granatensis, 17
Drimys Winteri, 17
Drogue amère, 285
Drosera communis, 66
muscipula, 66
Dryobalanops Camphora, 98
Dulse, 434
Dumb Cane, 364
Durian, 94
Durvillea, utilis, 434
Durreoaye Narriol, 301
Duvaua latifolia, 167
Dysoxylum, 102

Eagle wood, 197
Ebony, 227
Echinops strigosus, 254
Echites antidysenterica, 300
Echium plantagineum, 274
rubrum, 274
Eddoes, 364, P
Egg plant, 295
Egyptian bean, 14
Ehretia buxifolio, 273
Elæagnus orientalis, 194
arborea, 194
conferta, 194
Elæococca, 114
Elais guineensis, 345
Elatine, 52, *Elaterium*, 3 sp.
Elcaija, 102
Elder, 248
Elecampane, 253
Elephantopus scaber, 253
Elettaria Cardamomum, 324
Eleusine coracana, 377
Elm, 179
Elymus maritimus
arenaria
Embelia robusta, 225
Ribes, 225
Emetin, 245
Endive, 254
Ensiao, 164
Entada Pursætha, 155
Entelea arborescens
Enteromorpha compressa, 434
Epicharis, 102
Equisetum hyemale, 318
Equisetum majus
hyemale
Ergot, 377
Erigeron philadelphicum, 253
heterophyllum, 253
Eriodendron, 94
Erithrina corallodendron. P
Erva de Rata, 245
Eryngium campestre, 23
Erythrina monosperma, 152
Erythronium indicum, 353
Erythroxylon Coca, 123
hypericifolium, 123
suberosum, 123
Eucalyptus resinifera, 45
Eugenia Caryophillata
Euhalus, 335
Eulophia, 339
Eupatorium Ayapana, 254
perfoliatum, 253
Euphorbia, 113
antiquorum, 115
officinarum

Euphorbia canariensis, 115
Gerardiana, 115
Ipecacuanha, 115
papillosa, 115
neriifolia, 115
thymifolia, 115
pilulifera, 115
heptagona, 115
Tirucalli, 115
Euphorbium, 114
Euphrasia officinalis, 291
Evernia prunastri, 429
vulpina, 429
Evodia febrifuga, 133
Evonymus tingens, 119
Excæcaria, 116
Agallocha, 115
Exostema, 244

Fagara, 136
Faghureh, 136
Feronia elephantum, 106
Ferula, 23, *assafœtida*
Festuca pratensis, 378
Festuca elatior
Feuillea cordifolia, 52
Fever bark of Carolina, 244
Ficus religiosa, 177
toxicaria, 176
septica, 177
racemosa, 177
indica, 177
australis, 177
floridana
Fig, 176
Fir, 315
Silver, 316
Flagellaria, 357
Flax, grass, P
Flax, tropical, P
Flax of leaves, P
Flax, pineapple, P
Flindersia, 104
Fools' Parsley, 22
Fragaria, 144
Frambæsia, 133
Frankincense, 111
Fraxinus rotundifolia, 308
Frazera Walteri, 297
French berries, 108
Fruta de Burro, 19, 61
Fruta de Parao, 82
Fucus vesiculosus, 434
nodosus, 435
serratus, 435
Fumaria cava, 10
Fumarieæ, 10
Fungus melitensis, 394
Furze, 152
Fustick, 177

Galangale, 323
Galactodendron utile
Galbanum, 23
officinale, 23
Galega purpurea, 153
Galium verum, 250
Gallinha Chocha, 123
Gambeer, 244
Gamboge, 74
Garcinia cochinchinensis, 75
cornea, 75
paniculata, 75
Mangostana, 75
pictoria, 75
Garden Orach, 208
Gardenia, 245
Garlic, 353
Gauca, 206
Gaultheria procumbens, 220
Shallon, 220
Gela, 155
Gelidium, 434
Genipa, 245
Genista, 152, 153
Gentian, 297
Gentiana, lutea, 297
rubra, 297
purpurea, 297
Amarella, 297
campestris, 297
cruciata, 297
peruviana, 297
Chirita, 297
Geoffræa, 154
Geranium spinosum, 137
maculatum, 137
Robertianum, 138
Geum urbanum, 144
rivale, 144
Gheer, 111
Gillenia trifoliata, 144
stipulacea, 144
Gigartina helminthocorton, 435

Ginger, 323, P.
Ginseng, 25
Glaphyria nitida, 45
Glechoma hederacea, 276
Gleichenia dichotoma, 406
Gliadine, 377
Globba uviformis, 324
Gloriosa superba, 353
Glycosmis citrifolia, 106
Glycyrrhiza glabra, 152
Gnetum urens, 311
Gnemon, 311
Gobbo, 96
Golden Rod, 253
Gold thread, 6
Gombo. 96
Gomphrena officinalis, 208
macrocephala, 208
Gomuty Palm
Gooseberry, 26
Gracilaria lichenoides, 434
compressa, 434
tenax, 435
Gourd, 52, *economical*, sp., P
Graines d'Avignon, 108
Gram, 119
Grana molucca, 114
Grass oil of Nemaur, 377
Grass flax, P
Grass silk, P
Grass rope, P
Grass cordage, P
Gratiola officinalis, 291
peruviana, 291
Grawatha, 334
Gray Plum, 159
Grewia asiatica, 99
elastica, 99
sapida, 99
Grislea tomentosa, 100
Guaco
Guaiacum sanctum, 134
officinale, 134
Guaiacine, 134
* *Guaiacum tree*
Guatteria virgata, 18
Guarea Aubletia, 102
trichilioides, 102
Guava, 45
Guazuma ulmifolia, 94
Guettarda coccinea, 244
Guevina, 200
* Guilandina Bonduccella, 154
Nuga, 154
Guinea corn, 376
Gulancha, 215
Gum Ammoniac, 23
Animi, 98, 154
Arabic, 152, 154
Elemi, 111, 165
Kino, 45, 211, 244
Dragon, 152, 353
Lac, 152, 177
Senegal, 94, 152, 154
Tragacanth of S. Leone, 94.
Tragacanth, 147
Gunny, 99
Gustavia urceolata, 46
Gymnema lactiferum, 304
tingens, 305
Gynerium saccharoides
Gyrophora deusta, 429
pustulata, 429
Gypsophila Ostruthium, 125

Habzelia aromatica, 18
Hæmatoxylon campeachianum, 154
Hæmatin, 154
Hæmanthus toxicarius, 329
Haitsai, 435
Hanchinol, 100
Hartighsea, 102
Hashish, 176
Hazelnut, 170
Hedeoma pulegioides, 276
Hederine, 25
Hedychium coronarium, 323
Hedycarpus malayanus, 82
Hedysarum sennoides, 152
Heisteria coccinea, 33
Helianthus tuberosus, 254
Heliconia Psittacorum, 327
Heliconinia, several species
Helicteres Sacarolha. 94
Helleborus, 6.
Helonias dioica, 348
Helvella, 422
Hemidesmus indica, 305
Hemlock, 22
Hemlock Spruce, 316
Hemp, 176
Hemp of Sisal, P
Hemp of Manilla

Hemp of Leaves
Hemp of Petioles
Henbane, 294
Henequen, P
Henné, 100
Hepatica 6
Hepatic Aloes, 353
Herbe du Diable, 270
Hernandia sonora, 198
guianensis, 196
Heuchera americana, 163
Hibiscus arboreus, 96
Rosa sinensis, 96
Sabdariffa, 96, P
suratensis, 96
esculentus, 96
Abelmoschus, 34
longifolius, 96
tiliaceus,
Himanthalia lorea, 435
Hippocratea comosa, 120
Hippomane, 116
Hippomane Mancinella, 115
Hippophæ rhamnoides, 194
Hog plum, 107
Holcus saccharatus, 377
odoratus, 96
Sorghum
Spicatus
Bicolor
Holigarna longifolia, 167
Honeysuckle, 248
Hop, 176
Horse-chestnut, 84
Horseradish, 59
Hortia braziliana, 133
Hovenia dulcis, 108
Huile des Marmottes, 147
Humirium floribundum, 104
Humulus Lupulus, 176
Hungary water, 276
Hura, 113
crepitans, 115
Hursinghar, 309
Hya-hya, 300
Hyænanche globosa, 115
Hydnocarpus venenta, 70
Hydrastis canadensis, 6
Hydrilla, 335
Hydrocyanic acid, 147
Hydrophylax maritima, 245
Hymenæa Courbaril, 154
Hyoscyamus, 295
Hypericum Androsæmum, 78
hircinum, 78
connatum, 78
laxiusculum, 78
perforatum, 78

Iceland moss, 429
icica Acuchini, 111
Carana, 111
heptaphylla,
Icicariba, 111
Igasuric acid, 301
Ilex paraguensis, 229
Illicium anisatum, 17
India Rubber tree
vine
Indigo, 152, 153
Indigofera enneaphylla, 152
Anil, 153
tinctoria, 153
Inga, 89
fæculifera, 155
Inocarpus, 196
Inula Helenium, 253, 254
Inulin, 254
Ionidium parviflorum, 63
Poaya, 63
Itubu, 63
Ipecacuanha, 8, 63, 114, 116, 144, 244, 305
Ipe-tabacco, 282
Ipeuna, 282
Ipomœa Quamoclit, 231
sensitiva, 231
Iridæa edulis, 434
Iris florentina, 333
tuberosa, 333
versicolor, 333
verna, 333
Pseudacorus, 333
Ironwood, 227
Isidium Westringii, 429
Ivarancusa, 387
Ivy, 25

Jaboticabeiras, 45
Jacaranda wood, 155
Jack, 176
Jacquinia obovata, 226
Jagghery water, 155
Jalap, 214, 231

Janrosade, 45
Janji, 335
Japan lacquer, 167
Jasamine, 309
Jasminum officinale, 309
grandiflorum, 309
Sambac, 309
undulatum, 309
angustifolium, 309
Jatropha Cassava, 113, P
Manihot, 113, 113, P
glauca, 115
Curcas, 115, P
Jeffersonia, 7
Jenequen, P
Jew Bush, 116
Jits, 102
Joliffia africana, 52
Juglans cathartica, 180
cinerea, 180
regia, 180
Jujube, 108
Julpai, 97
Juncus effusus, 357
Juniper, 316
communis, 316
Sabina, 316
Jussiæa peruviana, 36
Justicia biflora, 285
Ecbolium, 285
Adhatoda, 285
pectoralis. 285
Gendarussa, 285
paniculata, 285

Kakaterro, 317
Kalanchoe brasiliensis, 161
Kalmia latifolia, 221
Kat, 119
Kassou Khaye, 103
Kava
Kawrie Tree, 315
Kayo Umur Panjang, 45
Khair Tree, 155
Khaya, 103
Kheu, 167
Khumrir-ool-mujnoon, 216
Kielmeyera speciosa, 80
Kingwood, 153
Kino, 152
Kiriaghuna Plant, 304
Kirschenwasser, 147
Knowltonia vesicatoria, 6
Kodoya Bikh, 6
Kokra, 172
Kola, 94
Krameria, 86
Kunkirzeed, 254
Kuteera, 80
Kydia calycina, 94

Labaria Plant, 364
Labdanum, 91
Laburnum, 152, 153
Lac, black, 167
Lace Bark, 195
Lacis, 191
Lacker, 167
Lactuca virosa, 254
sylvestris, 254
Lagunclara racemosa
Lalo, 94
Lamb's Lettuce, 266
Laminaria digitata, 434
potatorum, 434
buccinalis, 435
bulbosa, 435
Langsat, 102
Lanseh, 102
Lansium, 102
Lantana Pseudo Thea, 278
Larch, 315, 316
Lata
Lathyrus Aphaca, 153
tuberosus, 152
Laurel oil, 30
Laurentia pinnatifida, 434
Laurus Cassia, 201
Culilaban, 201
Malabathrum, 201
cupularis, 201
Quixos, 201
Cinnamomoides, 201
Pucheri, 201
Camphora, 201
Parthenoxylon, 201
Benzoin, 201
parvifolia, 201
globosa, 201
fœtens, 201
caustica, 201
Lavandula carnosa, 276
Laver, 434
green, 434

Lavender, 276
Lawsonia inermis, 100
Lecanora perella, 429
tartarea, 429
hæmatomma, 429
atra, 429
Lecythis ollararia, 47
Ledum palustre, 220, 221
Lemon, 105, 106
Lentil, 152
Lepraria chlorina, 429
Lepidostachys Roxburghi, 172
Le Petit Coco, 225
Lettuce, 254
Liane amère, 215
Liatris, 253
Libanus thurifera, 111
Lignum Vitæ, 134
Ligusticum Ajawain, 23
Lilium pomponium, 352
Lime, 105, 106
Limnanthes, 143
Lingua de Fin, 65
Linum catharticum, 89
selaginoides, 89
Liquidambar, 188
Liquorice, 152
Liriodendron tulipifera, 16
Lisianthus pendulus, 297
Lissanthe sapida, 222
Litchi, 82
Lithocarpus javensis, 170
Lithospermum tinctorium, 274
Litsea sebifera, 201
Lobelia cardinalis, 236
Tupa, 236
inflata, 236
Caoutchouc, 236
syphilitica, 236
longiflora, 236
Locust Tree, 153
Logwood, 152, 154, P
Lolium perenne, 378
temulentum, 377
Longan, 82
Lonicera corymbosa, 248
cærulea, 248
Lote, 108
Lotophagi, 108
Luhea divaricata, 99
paniculata, 99
Ludia, 73
Lucerne, 152
Lychnis dioica, 125
chalcedonica, 125
Lupulin, 176
Lycopodium, 366
Selago, 404
clavatum, 404
Phlegmaria, 404
Lygeum spartium
Lythrum Salicaria, 100
Lythrum ? Hunteri, 100

Macassar poison, 196
Mace, 15
Mache, 266
Macrocnemum cormybosum, 244
Madder, 249
Madia sativa, 254
Madhuca Tree, 226
Mæsua ferrea, 75
Magnolia tripetala, 16
excelsa, 16
glauca, 16
acuminata, 16
Yulan, 16
Magonia pubescens, 82
glabrata, 82
Maguey de Pulque, P
Maguey de Mezcal
Maguey de Cocuy
* Mahogany wood, 103
Mahva Tree, 226
Mais Peladero, 378
Maize, 376
Malach, 176
Malic acid, 26
Mallow, 96
Malpighia Moureila, 122
crassifolia, 122
Malva crispa, 96
Alcea, 96
Mammea, 75, P
Mammillaria, 54
Manchineel, 113
* Manchineel tree, 115
Mandiocca, 115
Manettia cordifolia, 244
Mangel Wurzel, 208
Mango, 167, P
* Mangrove, white, 279
* *black and red*
* Mangroves, 38

Manilla mulberry, P
Manna, 152 308
Manna of Mount Sinai, 127
Mannite, 127, 308
Maprounea brasiliensis, 116
Maranta arundinacea, 326
Allouyia, 326
nobilis, 326
ramosissima, 326
Marantha indica, P
alloui, P
Margosa oil, 114, 115
Margosa Tree, 102
Marjoram, 276
Marking-nut tree, 167
Marlea, 52
Marmalade, 226
Marmaleiro do Mato, 65
Marmeleiro do Campo, 116
Marsdenia tenacissima, 305
tinctoria, 305
Marsh Mallows, 96
Martin's Cancer Powder, 288
Maté, 229
Matricaria Parthenium, 253
Mauritia flexuosa
Maximiliania regia, 80
May Apple, 7
Maytenus, 119
Meconic acid, 8
Meconopsis napalensis, 8
Medlar, 146
Medlar of Surinam. 226
Medeola virgincia, 348
Medick, 152
Medullin, 225
Melaleuca leucadendron, 45
Melambo Bark, 13
Melampryum pratense, 292
Melanorhœa usitatissima, 167
Melia Azedarach, 102
Azedarachta, 102
Melia semperirens, P
Melilotus officinalis, 153
Melodinus monogynus, 301
Melon, 52
Memecylon edule, 41
Menispermic acid. 216
Menispermum palmatum, 215
cordifolium, 215
Coccilus, 216
edule, 216
Menyanthes trifoliata, 297
Mercurialis annua, 113
perennis, 113, 115
Mercurio do Campo, 123
Mertensia dichotoma, 400
Merulius lacrymans, 423
vastator, 423
Mesembryanthemum edule, 56
nodiflorum, 56
Michelia Doltsopa, 16
Microlæna spectabilis, 94
Mignonete 62
Mikania Guaco, 254
Mildew, 423
Milk Plant, 116
tree, 177, 226, 300
Milk tree of Colombia
Millet, 377
Milnea edulis, 102
Mimosa fagifolia, 155
saponaria, 154
Spongia, 155
Mimulus guttatus, 291
Mimusops Elengi, 226
Kaki, 226
Mint, 276
Mint Tribe
Mirabilis, 214
Mistleto, 50
of the Oak, 50
Mohoe, or Mohaut, 96
Momordica Elaterium, 52
Monnina polystachya, 86
Mootha, 385
Morel, 422
Morinda, 245
Royoc, 244
† Moringa, 154
† pterygosperma, 66. P
Morphia. 8
Morriche Palm
Morus alba, 177
tinctoria, 177
Mountain Ash. 146
Mouron. 224
Moutabea, 109
Moxa. 253
Mucedo. 423
Mucor. 423
Mucuna pruriens, 152
Mudar, 305

Mulberry, 176
Munjeeth, 250
Musa, 327
Abaca,
many species
textilis, 327
Musanga, 177
Mushroom, 422
Mustard, 59
Myginda Gongonha, 229
Myrica cerifera, 180
sapida, 180
Myristica moschata, 15
officinalis, 15
Otoba, 15
tomentosa, 15
Myrospermum peruiferum, 165
toluiferum, 165
Myrsine bifaria, 225

Nagkesar, 75
Nagur-mootha, 385
Narcissus poeticus, 329
Tazetta, 329
odorus, 329
Pseudo-Narcissus, 329
Narcotine, 8
Nard, 266
Nardostachys Jatamansi, 266
Natchenny, 377
Nauclea Gambeer, 244
Nectarine, 147
Neem Tree, 102
Nehai, 400
Nelumbium speciosum, 14
Nepeta hederacea, 276
Nephelium, 82
Nephrodium esculentum, 400
Nerium Oleander, 300
odorum, 300
Nesæa staticifolia, 100
Nigella, 6
Nightshade, 294
Niouttout, 165
Nirbishi, or Nir bikhi, 6
Nirmulee, 301
Noyau, 147, 231
Nut-grass, 385
Nutmeg, 15
Tribe, 15
of Santa Fe, 15
Nyctanthes Arbor Tristis, 309

Nymphæa alba, 13

Oak, 170
Oats, 376
Ochna hexasperma, 129
Ochro, 96
Ocymum album, 276
febrifugum, 276
Œnanthe pimpinelloides, 22
crocata, 23
Œnothera biennis, 36
Oil of Almonds, 147
Ben, 66
Olive, 281, 308
Tiglium, 114
Oldenlandia umbellata, 245
Olea fragrans, 308
europæa, 308
Olibanum, 111
Olivile, 308
Omphalea, 116
Ononis, 153
Onion, 353
Onosma echioides, 274
Opium, 254
Opoponax, 23
Oporanthus luteus, 329
Opuntia vulgaris, 54
Orange, 105
Orchall, 429
Orchis mascula, 339
Orelha de Onca, 215
Gato, 78
Origanum Dictamnus, 276
Ornithopus, 152
scorpioides, 153
Orobanche virginiana, 288
major, 288
Orontium aquaticum, 364
Orris root, 333
Orseille de Terre, 429
des Canaries, 429
Orthanthera viminea, 305
Osmunda regalis, 400
Oxalis acetosella, 140
crenata, 140
Oxleya xanthoxyla, 104

Pachana, 215
Pæonia, 6
Palapetta, 300
Palicourea Marcgraavii, 245

Palm oil, 345
Palma Christi, 114
Palm-Vine, 345
Pálo, 215
Palo de Vacca, 177
Panax Coloni, 276
quinquefolium, 25
Pancratium maritimum, 329
Pandanus, 362
Pandanus, many species,
Pandanus odoratissimus, 362
Panicum spectabile, 378
italicum
pilosum
frumentaceum
glaucum
colonum
grosarium
miliaceum
jumentorum
polygamum
maximum
arborescens, 50 *ft.*
altissimum
arundinaceum
Pao d'Arco, 282
Papaver somniferrum, 8
Papaw, 69
Papeeta, 301
Papyrus, 385
antiquorum
Para todo, 208
Paraiba, 130
Pareira brava, 215
Parinarium excelsum, 159
campestre, 159
montanum, 159
Parkia africana, 154
Parmelia saxatilis, 429
omphalodes, 429
encausta 429
conspersa, 429
parietina, 429
Parsley, 22
Parsnep, 22
Partridge wood, 33
Passan-Batu, 170
Passerina tinctoria, 195
Pastinaca Opoponax, 23
Paullinia australis, 82
polyphilla
eupania, 82
Paullinia subrotunda, 82
Paspalum frumentaceum
Pavonia diuretica, 96
Pe de Perdis, 114
Pea, 152
Peach, 147
Pear, 146
Pedalium murex, 281
Pediculares, 292
Pedilanthus tithymaloydes, 116
padifolius, 116
Peltidea aphthosa, 429
Penæa mucronata, 204
Pennyroyal, 276
Pentadesma butyracea, 75
Butter tree
Pentaptera, 39
Peon, 75
Pepper, 168
Pepper, black, 186
Peppers, 135
Pepper-dulse, 434
Perelle d'Auvergne, 429
Pergularia edulis, 304
Periploca emetica, 304
esculenta, 304
indica, 304
scammonium
græca
indica
Perpetua, 208
Persea gratissima, 201
Petiveria alliacea, 212
Phalaris arundinacea
Pharus latifolius
arundinacea
Phaseolus trilobus, 153
radiatus, 153
Phaseolus mungo
tunkinensis
aureus
max
radiatus
aconitifolius
Phellandrium, 23
Phleum, 378
Phlomis esculenta, 276
Phœnix fariniferra, 345
Photinia dubia, 146
Phryinium capitatum
Phrynium dichotomum, 326
Phyllanthus, 113

Phyllanthus, Niruri, 116
urinaria, 116
Emblica, 116
Conami, 116
Physalis Alkekengi, 294
flexuosa, 295
Phytelephas, 362
Phyteuma spicatum, 238
Phytolacca decandra, 210
Picrotoxia, 215, 216
Pierardia dulcis, 82
sativa, 82
Pinckneya pubens, 244
Pindaiba, 19
Pigeon-pea, 152
Piney varnish, 98
Pine-apple, 334
Pine, 315
Norfolk Island, 319
Weymouth, 315
Pinguicula vulgaris, 286
Pinus Cembra, 316
Gerardiana, 316
Lambertiana, 315, 316
sylvestris, 316
Pumilio, 316
Pinaster, 316
Pinea, 316
Picea, 316
Piper æthiopicum, 18
Cubeba, 186, nigrum
inebrians, 186
anisatum, 186
Betel, 186
Siriboa, 186
Pisonia, 214
Pistacia atlantica, 167
Lentiscus, 167
Terebinthus, 167
Nut, 167
Pistia Stratiotes, 368
* *Piscidia erythrina*, P
Pita de Coenyza
Pita de Tolu
Pita de Guataca
Pitafloja, P
Pitahaya, P
Pitch, 111
Burgundy, 316
Pittonba, 82
Pittosporum Tobira, 32
Plantago arenaria, 268
Plantago Ispaghula, 268
Psyllium, 268
Plataneæ, 187
Plukenetia corniculata, 116
Plum, 147
common, 147
Plumbago zeylanica, 270
europæa, 270
scandens, 270.
Plumeria obtusa, 300
Poa tenax
fluitans
aquatica
suditica
Abyssinica
Poaya da praia, 63
Poaya branca, 63
Podocarpus neriifolia, 317
Podophyllum peltatum, 7
† *Poinciana pulcherrima*, P
Pois quéniques, 66
Polanisia, 61
Polyanthes tuberosa, 353
Polygala crotalarioides, 86
poaya, 86
Senega, 86
sanguinea, 86
Polygaline, 86
Polygonum Hydropiper, 211
barbatum, 211
chinensis
Fagopyrum, 211
hispidum, 211
tataricum, 211
aviculare, 211
Polypodium phymatodes, 400
Calaguala, 400
crassifolium, 400
Polyporus destructor, 423
Pomegranate, 45
Poplar, 187
Poppy, 8
Populus tremuloides, 187
Porliera hygrometrica, 134
Porphyra laciniata, 434
vulgaris, 434
Portlandia hexandra, 244
Potalia resinifera, 307
amara, 307
Potamogeton natans, 367
Potash, 295

Potato, 294
Potentilla anserina, 144
reptans, 144
Prangos pabularia, 22
Premna integrifolia, 278
Prinos verticillatus, 229
glaber, 229
Prinsepia utilis, 159
Prosopis, 154
Prunes, 147
Prunus spinosa, 147
domestica, 147
brigantiaca, 147
Cocomilia, 147
Prussic acid, 147
Psoralea corylifolia, 152
Psychotria emetica, 245
herbacea, 245
noxa, 245
Ptarmica, 253
Ptelea, 136
Pteris aquilina, 400
esculenta, 400
Pterocarpus, 346
santalinus, 152
dalbergioides, 153
erinacea, 152
Draco, 152
Puccinia graminis, 423
Puccoon, 8
Puchinango
Pueraria, 152
Pulque, 329, P.
Purslane, 124
Pyrus Aria, 146
Aucuparia, 146

Quassia, 130
Simarouba, 136.
Quercus falcata, 170
Suber, 170
Ægilops, 170
Quina, 244
Quina de la Angostura, 132
blanca, 114
de la Guayna, 132
Quince, 145
Quinquina, 244, 308
of Peru, 165
Piton, 244
des Antilles, 244
Qurjun, 98

Radish, 59
Rafflesia, 392
Raiz do Mato, 206
Padre Salerma, 208
Raiz Preta, 245
Ral, 98
Ramalina scorpulorum, 429
Rambeh, 82
Rambutan, 82
Rampion, 238
Ramturai, 96
Randia dumetorum, 245
Ranunculus Flammula, 6
sceleratus, 6
glacialis, 6
Thora, 6
Rape, 59
Raspberry, 144
Ratanhia, 86.
Reaumuria vermiculata, 92
Rebenta cavallos, 236
Red sandal-wood, 154
Redwood tree, 103
Remija ferruginea, 244
vellozi, 244
Reseda luteola, 62
Resin of Coumia, 154
Restio tectorum 3 *feet*
virgatus
dichotomus
vaginatus
paniculatus, 2 *feet*
Restio tectorum, 387
Rex amaroris, 86
Rhamnus catharticus, 108
infectorius, 108
saxatills, 108
amygdalinus, 108
Rheum, 211
Rhizophora mangle
Rhizomorpha, 423
Rhizophora gymnorhiza, 40
Rhododendron ferrugineum, 220
chrysanthemum, 220
ponticum, 221
maximum, 221
arboreum, 221
campanulatum, 221
Rhodomenia palmata, 434
Rhubarb, 211
Rhubarbarin, 211
Rhus Coriaria, 167

Rhus, toxicodendron, 167
radicans, 167
Cotinus, 167
vernix, 164
succedaneum, 168
verniciferum, 168
glabrum, 168
Rice, 359, 376
Rice paper of China
Richardsonia rosea, 245
scabra, 245
Ricinus, 116
Ricinnus communis, 113
Ritta Kaddapoo, 111
Roccella fusiformis, 429
tinctoria, 429
Robinia, 152
Pseudacacia, 153
Rocambole, 353
Rocou, 73, P
Rohuna, 103
Rondeletia febrifuga, 244
Rosa rubiginosa, 144
canina, 144
damascena, 144
gallica, 145
Rose Apple, 45
Rosemary, 276
Rosewood, 152, 155
Rough-skinned Plum, 159
Rowan Tree, 146
Roxburghia, 360
Rubia tinctoria, 249
cordifolia, 250
angustissima, 250
Munjista, 250
noxa, 250
Rubus arcticus, 144
villosus, 144
Rue, common, 132
Ruellia strepens, 285
Ruizia, 189
Rukta chundun, 154
Rumex acetosa, 211
Rush, 357
Russia Mats, 99

Sabbatia angularis, 297
Saccharum officinalis
sinense
exaltatum
polystachion
Munja
Saccharum procerum
violaceum
caudatum
contractum
Saffron, 333
Sagapenum, 23
Sage, 276
Sageretia theezans, 108
Sagittaria, 356
Sago, 313, 345
Portland, 364
Sagus farinifera, 345
Saint Foin, 152
Saint Ignatius's Bean, 301
Sal, 98
Salep, 339
Salacia, 120
Salicine, 187
Salicornia, 209
Salin viminalis
stipularis
Forbiana
triandria
mollisima
alba
Russeliana
rubra
Salisburia, 317
Salix herbacea, 187
helix, 227
Sallow, 187
Salsafy, 254
Salsola, 209
Samanbaya, 400
Samphire, 22
Sandarach, 316
Sanders's wood, 193
Sandoricum indicum, 102
Sanguinaria canadensis, 8
Sanguisorba officinalis, 148
Santalum album, 193
Santolina, 253
Sapindus esculentus, 82
saponaria, 82
Sapium, 116
aucuparium, 116
Saponaria officinalis, 125
Saponine, 82
Sappodilla Plum, 226
Sappan wood, 154
Sapucaya, 47
Sarcocolla, 204
Sarcocollin, 204

Sarsaparilla, 25, 359
German, 385
of India, 305
Satin wood, 104
Saunders's wood, 152
Saurauja, 80
Sauvagesia erecta, 64
Savin, 316
Savory, 276
Scabiosa succisa, 265
Scabious, 253
Scammony, 231
Scandin oderatu
Schinus Molle, 167
Arroeira, 167
Schmidelia edulis, 82
Scilla maritima, 353
Lilo-Haycinthus, 353
Scillitin, 353
Scio Turpentine, 167
Scirpus, 385
lacustris
Scleria lithosperma, 385
Scoparia dulcis, 291
Scorzonera, 254
hispanica
latifolia
Scotch Fir, 315
Scrophularia aquatica, 291
nodosa, 291
Sea Kale, 59
Sea-wrack, 367
† Sebesten Plum, 273, P
Sechium edule
palmatum
Sedges, 384
Sem, 153
Semecarpus Anacardium, 167
Sem-ke-gond, 154
Sempervivum tectorum, 164
glutinosum, 164
Senacia undulata, 32
Senegine, 85
Senna, 153, 300, 305
Alexandrian, 154
Serradilla, 152
Service, 146
Serjania triternata, 82
Sesamum, 281
Sesbaina gloriosa, P
Sesbania picta
Sesbania grandiflora, 152, P
Setaria italica
germanica
viridis
glauca
tenacissima
Shallot, 353
Shorea robusta, 98.
Sicyos angulata
dulcis
edulis
Sida abutila, 96
cordifolia, 96
mauritiana, 96
micrantha, 96
carpinifolio, 96
lanceolota, 96
Siegesbeckia orientalis, 253
Silene virginica, 153
Silk cotton-tree, P
Silphium, 22
Simaruba versicolor, 130
Simbi, 153
Sinapis chinensis 59
Singhara nuts, 37
Siphonia elastica, 116
Sissoo, 153
Skirret, 22
Skunk Cabbage, 364
Smilax Sarsaparilla, 359
China, 359
aspera, 359
* *Smilax Pseudo China*
Smut, 423
Snake poison, 244
Soccotrine Aloes, 353
Solanum Pseudoquina, 294
nigrum, 294
esculentum, 295
Jacquini, 295
bahamense, 295
mammosum, 295
Dulcamara, 295
Solidago odora
Solorina crocea, 429
Sorghum saccharatum
vulgare
Sorrel, 211
Sosquil, P
Souari Nuts, 76
Soulamea, 86
Sour sop, P
Sow Bread, 223

Soymida febrifuga, 103
Spanish Chestnut, 170
Spartinia polystacha
Spermacoce ferruginea, 245
Poaya, 245
Sphæralcea cisplatina, 96
Spigelia marylandica, 299
Spikenard, 226
Spilanthus, 253
Spinach, 63, 280
Spiræa ulmaria, 144
* Spondias, 107
mombici
mirabolanos
Spruce, 315
Squill, 329
Stachys palustris, 276
Stachytarpheta jamaicensis, 278
Stagmaria verniciflua, 167
Stalagmitis Gambogiodes, 75
Star-apple, 226
Star-anise, 17
Star-reed, 206
Statice caroliniana, 270
Sterculia acuminata, 94
Chicha, 94
Tragacantha, 94
guttata, 94
fœtida, 94
urens, 94
Stevia febrifuga, 253
Sticta pulmonacea, 429
Stillingia sebiferæ
Stipa tenacissima
Stone-oak, 170
Stone-pine, 316
Storax, 188, 228
liquid, 316
Stramonium, 294
Stravadium, 65
racemosum, 46
Strawberry, 144
Strawberry prickly pear, P
Strelitzia, several species
Strychnia, 136, 301
Strychnos colubrina, 301
Tieute, 301
potatorum, 301
innocua, 301
S. Ignatii, 301
Nux vomica, 301
Pseudo-quina, 301
Styrax, 228
Suberin, 170
Succory, 254
Sugar-cane, 377
Sulphur, 153
Sumach, Venetian, 167
Sunflower, 254
Suple Jack
Suwarrow nuts, 76
Swallows' nests, 434
Sweet sop, P
Symphium asperrimum
Swietenia Mahagoni, 103
Symplocarpus fœtida, 364
Symplocos, 228

Tabasheer, 377
Tabernæmontana utilis, 300
Tacamahaca, 75, 165
Tachia guianensis, 297
Tagua, 362
Tallow trees
Talinum patens, 124
† Tamarind, 154, P
Tamarix gallica, 127
indica, 127
dioica, 127
orientalis, 127
Furas, 127
africana, 127
Tampui, 82
Tanghin tree, 300
Tangle, 434
Tansy, 253
Tapioca, 115
Taquarussa, 377
Taro
Tarragon, 254
Tat, 99
Tea, 80, 400
Tea Tree, 278
Green, 331
Teak, African, 116
Teasel, 265
Tetragonia expansa
Tectona grandis, 278
Tej-bul, 136
Tephrosia, 153
Appollinea, 153
Terminalia alata, 38
Bellerica, 38
Benzoin, 39

† Terminalia Catappa, 39
Chebula, 38
latifolia, 39
Terra japonica, 155
Theet-see, 167
Thesium, 193
Theobroma Cacao, 94
Theophrasta Jussiæi, 225
Thoa urens
Thuja articulata, 316
quadrivalvis, 316
Thumbergia odorante
fragrante
Thyme, 276
Ti
Ticorea febrifuga, 133
jasminiflora, 133
Ticu Palm
Tika, 119
Tilia, 99
Tingi da Praya, 226
Tinguy, 82
Tobacco, 212, 294
Mexican varieties, P
Toddalia aculeata, 136
Toddy, 102, 345
Tomatoes, 80
Tomato, 294
Tonka Bean, 153
Tonsella pyriformis, 120
Torenia asiatica, 291
Tormentilla, 144
Tragia involucrata, 116
Tragacanth, 80, 153
Tragopogon, 254
Trapa, 37
bispinosa, 37
Tree of long life, 45
Trefoil, 152
Trichilia emetica, 102
trifoliata, 102
speciosa, 102
Trichosanthes palmata, 52
Trichosanthes colubrina
tuberosa
Trifolium alpinum, 152
Triglochin, 367
Trincomalee wood, 99
Triosteum perfoliatum, 248
Tripe de Roche, 429
Triphasia, 106
Tripterella cœrulea, 331
Tripsacum dactyloides
Tropæolum majus, 140
tuberosum, 140
Trophis Ramon, P
Truffle, 422
Tsin-y, 16
Tuber, 422
Tuberose, 353
Tumbugaia, 98
Turmeric, 324, P
Turnip, 59
Turnsol, 113
Turpentine, oil of, 316
Bourdeaux, 316
Strasburgh, 316
Venetian, 316
Tussilogo Farfara, 253
Typha, 366
latifolia
Ule, 177
Ulex europæas
Ulfmossa, 429
Ulmin, 179
Ulva latissima, 434
Unona Æthiopica
Upas, 176, 301
Urania-var-spec
Urania speciosa, 327
Urceola elastica, 300
Urceolaria scruposa, 429
cinerea, 429
Urena lobata, 96
Urtica dioica, 176
urens, 176
pilulifera, 176
crenulata, 176
stimulans, 176
tenacissima, 305
Usnea plicata, 429
Uvaria tripetaloidea, 18
febrifuga, 19
aromatica
Vaccinium Vitis Idea, 220
Vahea, 300
Valerian, red, 266
Valeriana Phu, 266
officinalis, 266
celtica, 266
Jatamansi, 266
Valerianella, 266

Vallisneria alternifolia, 335
Vangueria, 246
Vanilla, 342
Varnish of Sylhet, 167
Martaban, 167
Variolaria, 429
lactea, 429
Vateria indica, 98
Velame do Campo, 114
Velonia, 171
Veratrin, 348
Veratrum, 348
Sabadilla
viride, 348
Verbesina sativa, 254
Vernonia anthelmintica, 253
Vervain, 278
Vetch, 152
Viburnum, 248
Vicia var. spec
Vijuco del Guaco, 254
Villarsia nymphoides, 297
ovata, 297
Vin d'Aulnée, 253
Vine, 31
Vino Mercal, 329
Viola canina, 63
V. ipecacuanha
Virola sebifera, 15
Vish, or Visha, 6
Vismia guianensis, 78
Voacanga, 300
Voa Vanga, 245

Wachendorfia, 330
Walkera serrata, 129
Waltheria Douradinha, 94
Walnut, 180
Wampee, 105
Water-cress, 59
Webera Ipecacuanha, 244
Weinmannia, 161
Wheat, 376
Whortleberry, 222
Wild Cherry, 147
Wild Ginger, 206
Willdenowia teres, 387
Willow, 187
Willow bark, 187
Willughbeia edulis, 300, 301
Winter's bark, 187
Wittelsbachia insignis, 80
Wood-oil, 98
Woodruff, 250
Wormseed Oil, 209
Wormwood, 253
Wrightia antidysenterica, 300
tinctoria, 300
coccinea, 300
mollisima, 300

Xanthochymus pictorius, 75
Xanthophyllum, 86
Xanthorhiza apiifolia, 6
Xanthoxylum Clava, 136
piperitum, 136
fraxineum, 136
hastile, 136
caribæum, 136
Avicennæ, 136
hiemale, 136
Ximenia americana, 33
Xylocarpus granatum, 102
Xylopia sericea, 19
Xyris indica, 388

Yallhoy, 86
Yams, 359, 364
Yellow root, 6
Yellow wood, 104
Yercum, 305
Yew, 317
Young fustick, 167
Yucca filamentosa
gloriosa
aloifolia
angustifolia
recurvifolia
acaulis
Boscii

* *Zamia integrifolia*
Zedoary, 323
Zimone, 377
Zingiber officinalis, 323, P
Zinzeyd, 194
Zizyphus Jujuba, 108
Zostera, 367
Zygophyllum Fabago, 134

A comparison of the number of Cubean plants mentioned in this list, with the indigenous and exotic plants already in tropical Florida, will exhibit the importance and facility of introducing the remainder. H. P.

I. PLANTAS QUE SIRVEN DE BASE A LA AGRICULTURA CUBANA.

Plants which serve as a basis to the agriculture of Cuba.

* Dudoso, Dolichos bulbosus.
† Manihot cannabina, Mc. 10a.
‡ I have found *five* males only in all the flowers of a and b.

Cereales.—Grains.

Maíz	-	-	*Mc.* 3 *a.*	Zea mais,	*Gramineæ.*
Arroz	-	-	6. 2.	Oryza satíva,	
Trigo	-	-	3. 2.	Triticum cstivum,	

Raíces harinosas.—Farinaceous roots.

Boniato	-	-	5. 1.	Convolvulus batatas, *Convolvulaceæ*
Jicama	-	-	*Dd.* 10*a.*	*Phaseolus tuberosus, *Leguminosæ*
Yuca	-	-	*Mc. md.*	† Jatropha manihot, † *Euphorbiaceæ*, P
Llerenes	-	-	1. 1.	Marantha, *alloni*, *Cannæ*, P
Malanga	-	-	*Mc. pa.*	Arum sagítifolium, *Aroideæ*, P
Name	-	-	-	Discorea alata. D. satíva. D. bulbifera. *Dioscorodæ*
Papas	-	-	-	Solanum tuberosum, *Solanæ*
Sagú	-	-	-	Marantha indica, *Cannæ*, P
i	-	-	-	Alstroemería edulus, A. latifolia, *Amarylladæ*

Frutos harinosos.—Farinaceous fruits.

Arbol del pan	-	-	*M.* 1*a.*	Artocarpus incissa doméstica	
Cástano del Malabar		-		Artocarpus incissa, *Urticæ*	
Plátano hembra	-	-	6. 1.	a Musa paradisiaca ‡	*Musaceæ.*
hembrita			*Pg. Mc.*	Musa regia, Rump, ex Montvde	
guineo	-	-	-	b Musa sapientium ‡	
rosado	-	-	-	Musa rosacea	
rojo chico		-	-	Musa coccinea	

* *Dwarf Banana of Mantanzas*

* Mons. John Michel, of Charleston, South Carolina, says that, at Matanzas, there are very fine species of *dwarf bananas* to be obtained by addressing Mons. Chapeau, or M. Chartrand.

Semillas comestibles.—Edible seeds.

Ajonjoli	-	-	*Dn. as.*	Sesamum orientale, *Sesameæ*
Chicharos	-	-	-	Pisum sativum
Frijoles	-	-	*Dd.* 10*a.*	Phaseolus vulgaris
Id. del pais ó frijol caballero			-	Dolichos lablad
Idem grandes	-	-	-	Dolichos sexquipedalis
Garbudzos	-	-	-	Cicer arietinum
Gandú	-	-	-	Citisus pseudo, cajan
Lenteja	-	-	-	*Ervum lens?*
Maní	-	-	*Dd.* 10*a.*	Arachis hipogea, *Leguminosa*
Quimbombó		-	*Md. pa.*	Hibiscus esculentus, *Malvaceæ*

Legumbres.—Vegetables.

Acelga	-	-	5. 2.	Beta v. albida, *Chenopodeæ*
Brócoli	-	-	-	Brassica oleracea laciniata viridis
Col	-	-	*Tn. sq.*	Brassica oleracea
				Brassica capitata
Coliflor	-	-	-	B. O. botrytis
Chayo	-	-	*Mc. md.*	Jatropha urens, *Euphorbiaceæ*
Escorzonera	-	-	*Sg. æ.*	Scorzonera latifolia, *Compositæ*
Espárragos	-	-	6. 1.	Asparragus sativus, *Asphodelæ*
Nabos	-	-	*Tn. sq.*	Brassica napus, *Cruciferæ*
Palmito	-	-	6. 3.	Oreodoxa regía, *Palmæ*
Rábanos	-	-	*Tn.*	Raphanus sativus, *Cruciferæ*
Remolacha	-	-	5. 2.	Beta vulgaris, *Chenopodæ*
Verengena	-	-	6. 1.	Solanum melongena, *Solanæ*
Zanahoria	-	-	5. 2.	Daucus carrota, *Umbelliferæ*

Ensaladas y salzas.—Salads and sauces.

Acederas	-	-	10. 5.	Oxalis acetosa, *Geraniaceæ*
Ajo	-	-	6. 1.	Allium sativum, *Asphodelæ*
Ají				
Ají dátil				
Ají caballero	-	-	5. 1.	Capsicum. Varias especies. *Solanæ*
Ají guaguao				
	-	-	-	Capsicum microcarpum
Aleluya (*red sorrel*)			*Md. pa.*	Hibiscus sabdarifa, *Malvaceæ*, P
Albahaca		-	*Dn.*	Ocymun basilicum, *Labiatæ*
Anis	-	-	-	Anethum foeniculum
Apio	-	-	5. 2.	Apium graveolens
Berros	-	-	*Tn.*	Sysimbrium nasturnium, *Cruciferæ*
Bledos	-	-	*Mc. md.*	Amarantus oleraceus. A. sanguineus, &c.
Borraja	-	-	5. 1.	Borrago officinalis, *Boraginæ*
Calabaza		-	*Mc. md.*	Cucurbita pepo, *Cucurbitaceæ*
Cebolla	-	-	5. 1.	Allium cepa, *Asphodelæ*
Chayote	-	-	*Mc. md.*	Sycios edulus, *Cucurbitaceæ*, P
Chicorea	-	-	*Sg.*	Cicorium endivia, *Compositæ*

Umbelliferæ

Cruciferæ.

Culantro - -	-	5. 2.	Cicoriandrumsativum, *Umbellifera*
Espinacas -		*Do.* 5*a.*	Spinacea oleracea, *Polygonæ*
Lechuga - -	-	*S.*	Lactuca sativa, *Compositæ*
Mejorana - -	-	*Dn.*	Origanum majorana, *Labiatæ*
Mostaza - -	-	*Tn.*	Sinapis juncea, *Cruciferæ*
Orégano - -	-	*Dn.*	Origanum majoranoides, *Labiatæ*
Orégano frances -	-	2. 1.	Monarda punctata, *Labiatæ*
Pimiento - -	-	5. 1.	Capsicum annum, *Solanæ*
Pepino - -		*Mc. md.*	Cucumis sativus, *Cucurbitaceæ*
Peregil - -	-	5. 2.	Apium petroselinum, *Umbellifera*
Tomates - -	-	5. 1.	Solanum lycopersicum, *Solanæ*
Tomillo - -	-	*Dn.*	Thymus vulgaris, *Labiatæ*
Verdolaga -	-	*Do.*	Portulaca oleracea, *Portulaceæ*
Vinagrera -	-	10. 5.	Oxalis cornuta, *Gerancaceæ*
Volatines - -	-	-	Gynandropsis pentaphilla
Yerba buena -	-	*Dn.*	Mentha sativa, *Labiatæ*
Yedra - -	-	5. 3.	*Basella, Chenopodeæ*

Frutas.—Fruits.

Aguacate - - - -	-	Persea gratissima, P
Almendra - - -	-	*Amigdalus communis*
Almendro - - - -	-	† Terminalia catappa
Anon - - - -	-	Annona squamosa, P
Avellano - - -	-	Amphalea triandra
Cacao - - - -	-	Theobroma cacao
Caimito - - -	-	Chrysophillum cainito, P
Caimitillo - -	-	Chrysophillum oliviforme, P
Canisté - - -	-	Sapota elongata, P
Cerezas - - -	-	† Malpighia punicifolia
Chrimoya - -	-	Annona Humboldtiana, P
Cidra - - -	-	Citrus Médica, P
Ciruelas coloradas, blancas y amarillas - - -	-	* Spondias
Coco - - -	-	† Cocos nucifera } *Palmæ*
Corojo - - -	-	Cocos crispa } *Palmæ*
Fresas - - -	-	Fragaria vesca
Granado - - -	-	Punica granatum
Grossella - - -	-	†Cicca racemosa, *Euphorbiaceæ*
Guanábana - -	-	Annona muricata
Guanábana cimarrona -	-	Annona (palustris ?)
Guayabas del Perú -	-	Psidium pyriferum
Guayabas cotorreras -	-	Psidium pomiferum
Hicaco - - -	-	* Chrisobalanus icaco
Higo chumbo - -	-	Opuntia, varias especies
Higo - - -	-	Ficus carica
Lima - - -	-	† Citrus limeta
Limon - - -	-	Citrus limonum, P
Limoncito - -	-	Limonia trifoliatia
Mamey colorado -	- 5. 1.	Lucuma Bomplandi, *Sapolæ*, P
Mamey de Sto. Domingo -	*Pa.* 1.	Mammea american, *Guttiferæ*, P
Mamon - - -	-	Annona glabra
Mamoncillo Guaya -	-	Melicocca bijuga, P

Mango	-	-	Mangifera doméstica, P
Maranon	-	-	Anacardium occidentale, P
Mora	-	-	Morus celtidifolia
Melon	-	-	Cucumis melo
Naranja de China	-	-	Citrus aurantium
agria	-	-	Citrus vulgaris ? ex Mtvde
cajel	-	-	Id.—*var.*
moréira	-	-	Citrus nobilis.—ex Mtvde
Nuez del pais	-	-	Juglans (cinerea ?)
de la India	-	-	Aleurites triloba
Passionaria ó granadilla	-	-	Passiflora quadrangularis
Papaya	-	-	* Carica papaya
Pina	-	-	Bromelia ananas
Poma rosa	-	-	Jambosa vulgaris, P
Sandía	-	-	Cucurbita citrullus
Sapote	-	-	Sapota mammosa, P
Sapote de culebra	-	-	Lecuma serpentaria
Sapote negro	-	-	Dyospiros, obtusifolia, *Tauch* ? P
Sapote blanco	-	-	?
Tamarindo	-	-	‡ Tamarindus occidentalis, P
Uvas de la caleta	-	-	* Coccoloba uvifera
Ubas de Europa	-	-	Vitis vinifera

Plantas que se cultivan en grande para la esportacion.—Great staples for exportation.

Algodon	-	-	Gosypium hirsutum
Café	-	-	Coffea arabica, P
Cana de azúcar criolla	-	-	Sacharum oficinale
listida	-	-	Var—fasciolatum
morada	-	-	S. violaceum
de Hotahiti	-	-	S. O. var. tahitense
Tabaco	-	-	Nicotiana tabacum

Aplicables á los tintes.—Plants for dyes.

Anil cimarron	-	-	Indigofera citisoydes
de Goatemala	-	-	Indigofera disperma
del Senegal	-	-	I. argentea
Azafran	-	-	Carthamus tintoria
Bija	-	-	Bixa orellana, P
Brasil y brasilete	-	-	Coesalpinia
Bledo carbonero	-	-	Phytolaca decandra
Campeche	-	-	Hoematoxylum campechanum, P
Curcuma	-	-	Curcuma americana, P
Manajú, la resina	-	*M.*	Calpighia ?

Aplicables por sus aceites.— Yielding oils.

Ajonjolí	-	*Dn. as.*	Sesamum orientale
Ben	-	10. 1.	† Moringa pterigosperma, *Sesam*, P

Coco - -	- *Mc.* 6*a.*	† Cocos nucifera	*Palmæ*
Corojo de Guinea -	- *Dc.* 6*a.*	Elais Guineensis	
Cani - -	*Dd.* 10.	Arachis hypogea, *Leguminosæ*	
Mirasol - -	- *S. fr.*	Hellanthus annuus, *Compositæ*	
Nuez de la India -	- -	Aleuritestriloba	*Euphorbiaceæ*
Palma cristi -	*Mc. md.*	Ricinuscommunis	
Pinon - -	- -	Jatropha curcas	

Aplicables para la cordelería y tejidos.—Suitable for cordage and cloth.

Algodon - -	*Md. pa.*	Gossypium.—Varias especeies,	*Malvaceæ*
Cánumo del Senegal	- -	Hibiscus cannabinas,	
Ceiba, - -	- *Md. do.*	Eriodendrom anfractuosum	
Ceibon - -	*Md. pa.*	Bombax pentandrum, *Bombacea,* P	
Chichicastre -	- *Mc.* 4*a.*	Urtica baccifera, *Urticeæ*	
Daguilla - -	- 8. 1.	Lagetta lintearia, *Thymelæ*	
Flor de la calentura	- 5. 2.	Ascleplias curasavica, *Asclepiad*	
Guamá - -	*Md.* 10*a.*	Lonchocarpos tenax, *Leguminosæ*	
Guizazo - -	- *Do.* 1.	Triumpheta semitriloba et Havanense, *Tiliaceæ*	
Jaguey - -	*Pg. Dc.*	* Ficus indica, *Urticeæ*	
Majágua - -	*Md. pa.*	Hibiscus tiliaceus, *Malvacea,* P	
Mulvaté - -	- *Pa.* 1.	Corchorus siliquosus, *Tilaceæ* P	
Pan de mono -	*Md. pa.*	Andansonia digitata, *Sterculiaceæ*	
Pina - -	- -	Bromelia annanas,	*Bromeliaceæ*
Pinuela - -	- 6. 1.	B. Karatas,	
Pita - -	- -	Furcraea foetida,	
Pita de corojo -	- *Mc.* 6*a.*	Cocos (crispa ?) *Palma*	
Plátano - -	5 ? 6. 1.	Todas las especies, *Musaceæ*	
Quimbombó -	*Md. pa.*	Hibiscus esculentus, *Malvaceæ*	

Aplicables por sus gomas y resinas.—Good for their gums and resins.

Almácigo - - -	-	* Bursera gumifera
Ayuda - - -	-	Zanthoxylum carribeum, &c.
Bálsamo del Perú -	-	Myroxyllum peruiferum
Cedro - - -	-	Cedrela odorata
Circuela - - -	-	* Spondias
Copal - - -	-	Hedwigia balsamifera ?
Goma elástica - -	-	Castillea elástica
Guaguaci - -	-	Laetia apelata.—L. Thamnia, &c.
Jabo - - -	-	Spondias (lutea ?)
Manajú - - -	-	Malpighia ?
Ocuje - - -	-	Calophyllum calaba
Resina animada - -	-	Hymenea courbarril

Aplicables como curtientes.—Good for tanning.

Guayabo silvestre y del Perú	-	Psidium pomiferum et pyriferum
Mangle blanco - -	-	Avicennia nitida

Maranon - - - -	Anacardium occidentale.
Moruro - - - -	Acacia (?)
Peralejo - - - -	Malpighia mureilla

II. PLANTAS QUE SIRVEN PARA EL ALIMENTO DE LOS ANIMALES.

Yerbas de pasto.—Herbs for pasture.

Abrojo - - - -	Tribulus cistoides
Almiron - - - -	Sonchus ?
Anil cimarron - - -	Indigofera citisoides
Bejuco de Cuba -	
Bejuco de campanilla - -	Convolvulus
Bejuco de conchitas - -	Clitoria tornata.—C. virginiana : var.
Bejuco marrullero - -	Phaseolus vexilatus
Bejuco moniato - - -	Convolvulus batatas
Berdolaga - - -	Portulaca oleracea
Borraja - - - -	Borrago oficinalis
Caguazo - - - -	
Cambute - - - -	
Canutillo - - - -	Commelina communis
Cana brava - - -	Bambusa arundinacea.
Carrizillo de monte - -	
Canamazo - - - -	Graminea
Canuela - - - -	Idem
Cerraja - - - -	Compuesta
Culantrilla - - -	
Chicorea - - - -	Compuesta
Escoba amarga - - -	Argyrocheta bipinnatifida
Grama de Castilla.—G. de caballos - - - -	Gramineas
Guizazillo - - -	Cenchrus muricatus
Guizazo de caballo - -	Triumpheta semitriloba T. havanense
Junco de cienaga - - -	
Malva comun - - -	Melochia piramidata
Malva blanca - - -	Walteria indica
Malva te - - - -	Corchorus siliquosus. P
Malva rosa - - -	Hibiscus mutabilis
Mano - - - - -	
Peregrina - - -	Hibiscus pheniceus
Palomilla - - -	
Pata de gallina - - -	Graminea
Romerillo blanco - - -	Coreopsis leucantha
Romerillo - -	Balbisia elongata
Rabo de zorra - - -	Sacharum ravenae
Sanguinaria - - -	Ilecebrum lanatum
Sagú - - - -	Marantha indica. P
Tomates silvestres cimarrones -	Solanum
Vinagrea - - - -	Oxalis cornuta
Yerba de D. Cárlos - -	Andropogon avenaceus

Yerba fina - - -	Agrostis
Yerba de guinea - - -	Panicum altissimum
Yerba lechera - - -	Euphorbia trichotoma E. centunculoides

Entre los pastos naturales deben incluirse una porcion de gramíneas de los géneros Panicum, Setaria, Paspalum, Oplismenus, &c., que se confunden bajo las denominaciones comunes de gramas. He visto comer á los animales vacunos, muchas es pecies de Convolvulus, de Desmodium, la Rhynchosia minima, la Lagasca mollis, &c.; pero ignoro aun que nombre llevan estas plantas en la Isla.

Hojas de árboles que comen los animales.—Leaves of trees eaten by animals.

Abey macho - - -	Iacaranda (?)
Abey hembra - - -	Leguminosa
Anon - - - -	Annona squamosa, P
Bucáre - - - -	Erythryna umbrosa
Ceiba - - - -	Eriodendrom anfractuosum
Guácima - - - -	Guazuma palybotrya
Guando de monte - - -	Corípha
Hueso - - - -	
Mamei colorado - - -	Lucuma Bomplandi
Mango - - - -	Mangifera doméstica, P
Moniatos, todos - - -	Laurus
Naranjoágrio - - -	Citrus vulgaris
Pinon - - - -	Erythryna coralodrendron
Pinon botija - - -	Jatropha curcas
Ramon - - - -	Trophis americana, P
Raspalengua - - -	Cassearia hirsuta
Roble blanco - - -	Tecoma pentaphila
Roble guayo - - -	Ehretia bourreria
Sabicú - - - -	Mimosa odorantissima
Sahúco - - - -	Sumbucus nigra
Tamarindo - - -	†Tamarindus occidentalis
Tengue - - - -	Leguminosa
Vibona - - - -	Hedera arborea
Yagruma macho - - -	Panax longipetalum
Yagruma hembra - -	Cecropia peltata
Yamao - - - -	Guarea trichilioides
Yanilla - - - -	Schmidelia cominia?

Frutos que comen lon animales, especialmente los cerdos.—Fruits eaten by animals, especially by hogs.

Acana - - - -	Achras disecta
Ateje - - - -	Cordia colococca
Bejuco colorado - - -	Serjania cubensis
Caimitillo - - -	Chrisophillum oliviforme, P
Casmagua - - -	
Castana del Malabar - -	Artocarpos incisa, *Exótica*
Ciruela amarilla - - -	*Spondias

Encina - - - -	Quercus (?)
Frijolillo - - - -	Lonchocarpos (?)
Guácima - - - -	Guazuma polybotrya
Guairage - - - -	Eugenia
Guayabas - - -	Psidium. 2 espec.
Guano prieto. Guano de monte -	Palmas
Guara colorada - - -	Cupania
Jagua - - - -	Genipa americana
Jocuma - - - -	Bumelia salicífolia
Macágua - - - -	
Macurige - - - -	Cupania (?)
Mamei colorado - - -	Lucuma Bomplandi
Maradon - - - -	Anacardium occidentale, P
Moniatos, todos - - -	Laurus
Naranja ágria - - -	Citrus vulgaris
Nogal - - - -	Juglans (cinerea?)
Ocuje - - - -	Calophyllum calaba
Palma real - - -	† Oreodoxa regia
Palma yagruma - - -	
Papaya - - - -	* Carica papaya
Peralejo - - - -	Malpighia mureilla
Pino - - - -	Pinus (?)
Quajani - - - -	Bumelia
Quiebra hacha - - -	Himenea ?
Raspalengua - - -	Casseaia hirsuta
Sapote - - - -	Sapota mammosa, P
Sapote de culebra - - -	Lucuma serpentaria
Yamao - - - -	Guarea trichilioides
Yagruma macho - - -	Panax longipetalum
Yaicage - - - -	
Yiatí - - - -	Excecaria lucida

III. MADERAS EMPLEADAS EN DIVERSOS USOS.

Woods employed in various uses.

Abei macho - - -	Iacaranda. Sp. nov.
Abei hembra - - -	Leguminosa
Acana - - - -	Achras disecta. Anb. ex Osa.
Agracejo - - - -	Brunelia inermis. Fl. Per ex Osa.
Agracejo carbonero - -	Excecaria
Almendro - - -	
Almendrillo - - -	
Arabo - - - -	
Arará - - - -	Bucida ?
Arbol del cuerno - - -	Acacia cornigera
Ateje - - - -	Cordia collococca. Sln.
Ayabacaná - - -	
Ayuda macho—Ayuda hembra—	
Ayuda badia - - -	Zanthoxylum
Bagá - - - -	* Annona palustris. Lin.

Baría - - - -	Cordia gerascantoides. Kunt.
Baullua - - - -	
Bijaguara - - -	Ceanotus colubrinus. Jacq.
Bijaguá - - - -	
Botija - - - -	Bombax gosypifolia. Cav. Mvde.
Brasil. Brasilete -	Cæsalpinia
Bucare - - - -	Erythrina umbrosa. H. et. B.
Cabo de hacha - - -	Trichilia spondioides. Swart
Caimito - - - -	Chrysophillum cainito. Lin., P
Caimitillo - - -	Chrysophillum oliviforme. Lam., P
Caja (palo de) - - -	Schmidelia viticifolia. H. et. B.
Camaron - - - -	
Caoba - - - -	*Swietenia mahagoni. Wild
Caobilla de costa - - -	Croton lucidum. Sw.
Carne de doncella - - -	Achras ?
Cedro - - - -	Cedrela odorata. Lin., P
Ceiba - - - -	Eriodendron anfractuosum. D. C
Ceibon - - - -	Bombax pentandrum, P
Chicarron - - -	Combretum. Sp. nov.
Cercero - - - -	Malpighia punicifolia. Lam.
Cerillo - - - -	
Cígua - - - -	Laurus martinicensis
Ciguaraya - - -	Trichilia glabra. Lin. T. haranense. Jacq.
Copal - - - -	Hedwigia balsamifera
Copei - - - -	Clusia alba
Cordoban - - - -	Miconia ceanothrina. D. C.
Cuaba blanca - - -	* Amyris floridana. A. diatripa. S.
Cuaba amarilla - - -	Croton
Cuajaní - - - -	Oumelia. ex Osa
Cucuyo ó Jiquí - - -	Bumelia nigra. Sw. ex Osa
Curbana - - - -	Canella alba. Sw.
Dagame - - - -	Calycophillum candidissimum. D. C.
Daguilla - - - -	Lagetta lintearia. Lam.
Ebano - - - -	Dyospyros
Encina - - - -	Quercus (?) an. sp. nov ?
Frijolillo - - - -	Lonchocarpos (?)
Fustete - - - -	Broussonetia tintoria. ex Montvde.
Gia - - - -	Cassearia ramiflora. C. Spinosa. C. silvestris. C. serrulata.
Goao - - - -	Commocladia dentata. Jaq. C. iliciofolia. Vild.
Granadillo - - -	Brya ebenus. Brow
Guaguací - - -	Laetia apetala. L. Thamnia &
Guácima baría - - -	Luhea rufescens
Guairage - - -	Eugenia baruensis. Wild
Guacamilla - - -	Prockia crucis. Wild
Guamá - - - -	Lonchocarpos tenax
Idem de costa - - -	Amorpha (?)
Guana - - - -	Hibiscus (?) ex Montvde.
Guara - - - -	Cupania glabra. C. tomentosa &

Guaybo ágrio - -	- Psidium pyriferum
Guayacan - -	- * Guaiacum sanctum. Lin.
Guayacancillo - -	- Guaiacum verticale. Ortega.
Guira criolla - -	- Crescentia cucurbitina. Sw., P
Guira cimarrona - -	- Crescentia cujete. Wild, P
Hicaco - - -	- * Crysobalanus icaco
Hueso - - -	- Swartia
Jaboncillo - - -	- Sapindus saponaria. Ait.
Jágua - - -	- Genipa americana. Lin.
Jaguey hembra - -	- Ficus radula. H. ex Montvde.
Jaguey macho - -	- * Ficus indica. Celastrus ex Osa.
Jibá - - -	- Erythroxylon havanense. E. ferrugineum. Cav.
Jiquí (ó cocuyo) - -	- Bumelia nigra. ex Osa.
Jobo - - -	- * Spondias lutea ? D. C.
Jocuma - - -	- Bumelia salicifolia. Sw.
Júcaro - - -	- Bucida. sp. nov.
Laurel - - -	- Laurus(?)
Lebiza - - -	- Laurus (?)
Lechoso - - -	- Faramae sertulifera. D. C.
Lengua de vaca - -	- Ægiphilla martinicensis. Sw.
Lloron - - -	- Guettarda lucida. ex Osa.
Maboa - - -	- Cameraria latifolia. Wild.
Macágua - - -	-
Macurige - -	- Cupania (nitida ?) D. C.
Maco - - -	- Ardisia michrantha ? D. C.
Majágua - - -	- Hibiscus tiliaceus. Lin., P
Majaguilla - -	- Pavonia racemosa. Sw.
Malaguetta - -	- Eugenia (?)
Malambo - -	-
Manajú - - -	- Malpighia ?
Mangle blanco - -	- * Avicennia nitida
Mangle negro - -	- * Avicennia tomentosa
Moniato macho y hembra. Id. ó laurel - - -	- Laurus
Moruro - - -	- Acacia
Mora - - -	- Morus celtidifolia
Nogal - - -	- Juglans (cinerea ?)
Ocuje - - -	- Calophyllum calaba. Jacq.
Palo de caja ó caja -	- Schmidelia viticifolia. H. et. B.
Palo de Campeche -	- Hoematoxylum campeachanum. Lin., P
Palo bronco - -	- Malpighia. ex Montvde.
Palo carbonero - -	- Excœcaria tinifolia
Palo santo - -	- Catartocarpus. ex Montvde.
Peralejo - - -	- Malpigh ia mireilla. ex Montvde.
Pimienta - - -	- Eugenia
Pino - - -	- Pinus (?)
Pinon de Cuba - -	- Erythrina (mitis ?) D. C. ex Mtvde.
Pinon espinoso - -	- Erythrina corallodendrom. Aix.
Pinon Frances - -	- Erythrina cristagalli. Lin.
Pitajoní - - -	- Gardenia ?

Ponací - - - -	Duhamelia patens. Lin.
Quiebra hacha - - -	Hymenea
Ramon - - - -	Trophis americana, P
Roble real de olor - -	Chelone?
Roble amarillo - - - -	Cytharexylum
Roble blanco - - -	Tecoma pentaphilla
Roble guayo - - -	Erhetia bourreria. Lin.
Sabicú - - - -	Mimosa odorantissima. ex Osa.
Sapote culebra - - -	Lucuma serpentaria. H. et B.
Sassafras - - - -	Icica?
Tengue - - - -	Leguminosa
Uvero - - - -	*Coccoloba uvifera. Lin.
Vibona - - - -	Erythalis pentagona. D. C. Hedera arborea. Sw.
Vigueta - - - -	?
Viriji - - - -	Eugenia buxifolia
Yaba - - - -	Andira inermis
Yagruma macho - -	Panax longipetalum. D. C.
Yaimiquí ó carne de doncella -	Achras
Yaití - - - -	Excoecaria lucida
Yaicuage - - -	
Yamao - - - -	Guarea trichiloides. Lin.
Yana - - - -	Procris
Yanilla - - - -	Schmidelia cominia. Sw.
Yaya - - - -	Guatteria virgata. D. C.
Yaya macho - - -	Mouriria myrtiloides. D. C.
Yayajabico - - -	Ceanotus reclinatus. L'H. Erythalis fruticosa. Lin.

* Indigenous plants of tropical Florida.
† Plants growing in tropical Florida.
P Plants sent or carried to tropical Florida by Perrine.

NOTE.—The preceding list was published four years ago, at Havana, and hence does not contain the names of any valuable plants subsequently introduced into the Royal Botanical Garden, or pattern plantation, near that city. The subscriber retains the original letters of Professor Don Ramon de la Sagra, of the 11th March and 28th April, 1833, and 3d October, 1834, in which he promises to aid the enterprise of domesticating tropical plants in South Florida with all the resources under his control, in return for the services of the subscriber in sending him valuable plants and intelligence from Yucatan.

HENRY PERRINE.

WASHINGTON, D. C., *February* 27, 1837.

EXPLANATORY APPENDIX.

The twenty-four engravings appended to this report are intended to illustrate the brief notices of *fibrous leaved plants* contained in the last twenty-two pages of the documents annexed to the report of the Committee on Agriculture of the House of Representatives, made on the 17th February, 1838, numbered 564, and consisting of 99 pages.

Plate No. 1. Fig. A, represents the shape and dimensions of a single green leaf of the Agave Sisalana, or Sisal *Hemp* Plant of Yucatan. Fig. B, do. do. do. of the Bromelia Pita, or forest pine-apple, *Flax* Plant of Goazacoalcos. Fig. C, exhibits the footstalk of a leaf of the Musa sapientium, or edible Banana of the tropics, intended to illustrate the structure of the Musa Abaca, or wild Banana of the Philipines, from whose petioles the Manilla Hemp is obtained. The original specimens of the leaves and petioles, and of the course and fine foliaceous fibres yielded by them, remain in the room of the Committee on Agriculture of the House of Representatives, and will be deposited in the agricultural department of the Patent Office.

Plate No. 2, Fig. A 1, represents an entire green leaf of Agave Sisalana, or Sisal Hemp Agave of Yucatan, of the variety called Yashquí. Fig. A 2. The fibres exposed from AA to the point of the leaf, by means of the *triangular wooden scraper* T: The unscraped butt end of the leaf is sustained by a board against the breast of the laborer, who then uses the scraping stick as curriers do their shaving knives. Fig. A 3. The foliaceous fibres exposed by the *notched* wooden scraper N: The laborer takes the butt end of the leaf in one hand, and extends the remainder obliquely across a pole, which is supported at an angle of 45 degrees by a post or wall; with the notched scraper in the other hand, one point of the notch is inserted through the leaf which is then drawn backwards, and the operation is repeated until the leaf is slit into five or six strips; each *strip* is then laid across the *pole*, and the *notched end* of the fixed scraper is *pressed upon it*, when the butt end of the leaf is drawn backwards, and the *fibres* of that *strip* are thus exposed: and so on successively till the cuticle, and cellular substances of the other strips are separated from the foliaceous fibres. By both figures it will be seen that these *fibres* are *longtitudinal* and *parallel*, and *are not* connected by *transverse fibres*. The butt end of A 3 exhibits the injurious effects of rotting by its own juices; and any process of maceration applicable to the dead dried barks of common flax and hemp, preparatory to extracting their cortical fibres, is equally injurious to the color and strength of the foliaceous fibres in living green leaves.

Plates 3 to 9, inclusive, exhibit plants embraced under the title of the *Pine-apple Tribe*. Plates 3 to 7 includes A, the *thick fleshy leaved* species; and plates 8 and 9, B, the *thin dry leaved* species.

A. Plate 3. Agave Mexicana, or *Fulque* Agave, which yields from its developing stalk the celebrated Mexican substitute for beer, wine, and cider.

Plate 4. Agave Sisalana, or Sisal Hemp Agave of Yucatan, whose mature green leaves yield the foliaceous fibres called Sisal Hemp, and Grass Hemp, in the United States, and *Sosquil* in Mexico. It is represented with the lower layers of leaves cut off, as it appears, after the first crop has been taken, to be scraped for market.

Plate 5. Furcræa gigantea: a species of a kindred genus of the Agave. The F. fœtida is said to yield valuable foliaceous fibres in Cuba.

Plate 6. Agave Americana; naturalized in the south of Europe; confounded by Humboldt, and his copyists, with the Agave Sislana, and the Agave Mexicana, or the *Henequen* Agave of hot lowland Yucatan, and the *Pulque* Agave of cool highland Mexico.

Plate 7. Agave Virginica: indigenous to the worst soils of the United States between the Potomac and the Mississippi.

B. Plate 8. Bromelia Ananas, or Edible Pine-apple plant; some writers assert that the leaves of some variety of this cultivated species yield fine foliaceous fibres of practical utility.

Plate 9. Bromelia Sylvestris, or wild Pine-apple plant: copied to illustrate the mode or growth of the Bromelia Pita, or forest Pine-apple, flax plant of Goazacoalcos.

Plates 10 and 11 exhibit two species of plants embraced under the section of the *Screw-pine tribe* of plants.

Plates 12 to 18, inclusive, exhibit plants embraced under the ordinal term of the Lily Tribe.

Plates 12 to 17, inclusive, exhibit species of Yucca indigenous to the most sterile soils of the United States, from the Potomac to the Mississippi, of which some extend to the Rocky mountains, and others are acclimated in our northern States.

Plate 12. Yucca gloriosa, or *Petre*, now growing in the garden of Mr. Buist, Washington city. Plate 17. Same species in flower.

Plate 13. Yucca angustifolia, before flowering. Plate 14. Do. do.. in flower.

Plate 15. Yucca aloifolia; this and the Y. gloriosa are both frequently called Adam's needle, Spanish bayonet, Petre, and sometimes Palmetto, &c.

Plate 16. Yucca filamentosa; common names are Bear's grass, Silk grass, Eve's thread, Everlasting, &c. The three last named species may be profitably propagated in the poorest soils of the United States.

Plate 18. Phormium tenax, Flax Lily of New Zealand; acclimated in the south of France, and now an important staple of agriculture and manufactures in that kingdom.

Plates 19, 20, and 21. Three species of plants of different genera, embraced under the *Banana Tribe.*

Ptate 19. Heliconia Psittacorum. The celebrated Dr. Samuel L. Mitchell supposed that the Manilla Hemp was obtained from one species of this genus.

Plate 20. Strelitzia regina; now in flower at the green-house of Mr. Buist, Washington city.

Plate 21. Musa *rosacea*, Red Banana; the stalk, *composed of the footstalks of the leaves*, illustrates the mode of growth of the Musa Abaca, or Manilla Hemp Banana. By Fig. C, Plate 1, it will be seen that these long broad Lamina may be employed in the manufacture of mats, &c., in their original state, by simple pressure and drying only; and that, by simply scraping only in their green state, they will yield very long and abundant fibres for spinning and weaving.

Plates 22, 23, 24, exhibit different plants of the Palm tribe.

Plate 22. Borassus flabelliformis, Palmyra Palm. The Gomuty Palm, or *black-cordage* tree of the East Indies is said by some botanists to be a brother species of the same genus.

Plate 23. Mauritia flexuosa, Morriche Palm, or celebrated tree of Life of the Guarumo Indians, on the inundated islands of the Orinoco, very valuable for its fibrous leaves and foliaceous fibres.

Plate 24. Bactris minor, Cane palm; said to be a brother species of the Ticu palm of Brazil, whose leaves yield superior substitutes for flax and hemp to an ignorant and indolent population. The botanical name given by Walsh is the Bactris Acanthocarpos.

H. P.

WASHINGTON, D. C., *March*, 1838.

Fagetastes Pa botanical leaf

C

Real Pineapple Pineapples Wax

c

Forest Pine apple Flax plant leaf

B

8 feet long 24 inches wide

b

Sisal Hemp Agave leaf

A

6 feet long 3 to 5 inches wide

CKB Fibres exposed

A 1
Bill unscraped yet
A 2
Bill unscraped
A 3
rotated by its own juices.
and hence dark
N
Wooden flat notched Scraper Fixed by one hand
T
Wooden triangular Scraper Moved by both hands

Agave Mexicana
(Pulque plant)

Agave Sisalana
variety Yashqui

(Sisal Hemp)

Furcræa gigantea

Agave americana

Agave virginica

Bromelia Ananas

Bromelia Sylvestris

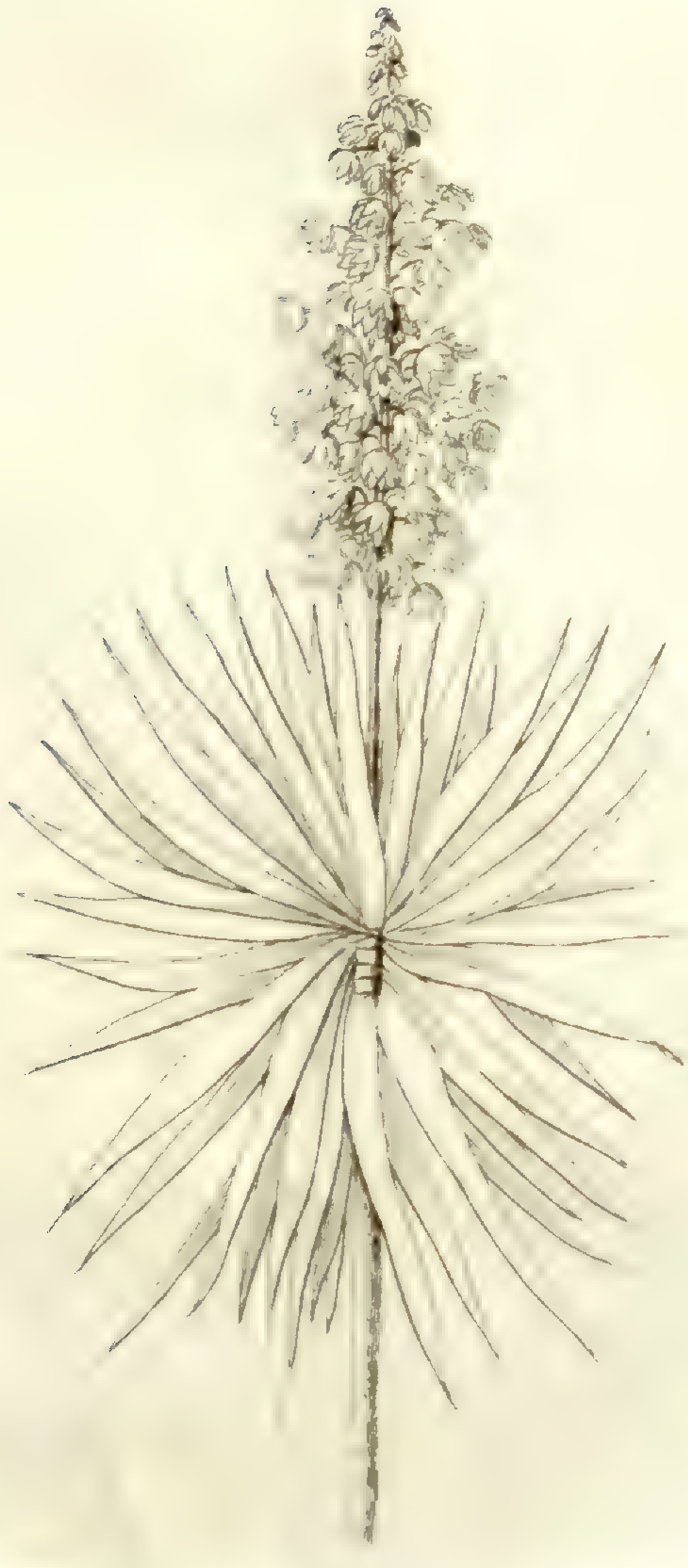
Pandanus odoratissimus

Pandanus Candelabrum

Yucca gloriosa

Yucca angustifolia

Yucca angustifolia



Yucca aloifolia

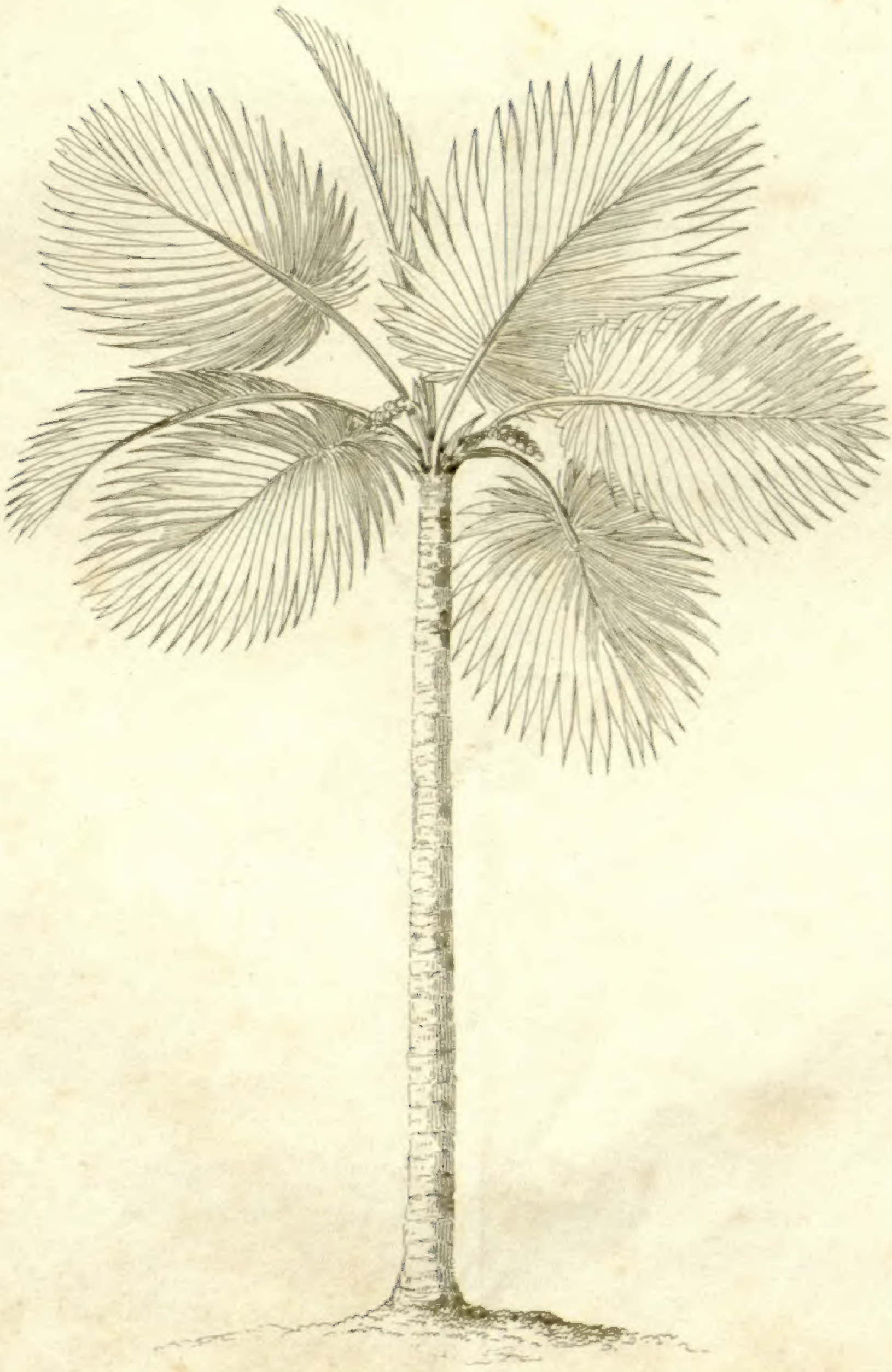
Yucca filamentosa

Yucca gloriosa

Phormium tenax
or Flax Lilly of New Zealand

Heliconia Psittacorum

Musa rosacea.



Borassus Flabelliformis

(Palmyra Palm)

Mauritia flexuosa

Bactris minor